THE

# JOURNAL OF GAS LIGHTING.

PUBLISHED MONTHLY.

No. 70, Vol. III.] LONDON, NOVEMBER 10, 1854. [Price 1s, In America 30 Cents.

## CONTENTS.


| | PAGE |
|---|---|
| *Circular to Gas Companies* | 565 |
| The Impurities of London Gas | 566 |
| Our Patent System | 567 |
| *Communicated Articles:—* | |
| The "Clay Purification" Process | 570 |
| *Correspondence:—* | |
| Clay Purification of Gas | 571 |
| The "Oil of Vitriol" Controvery | 573 |
| Warner's Dry Gas Meter | 574 |
| Bower's Retorts with Ridged Bottoms | 574 |
| *Miscellaneous News:—* | |
| City of London Commission of Sewers | 574 |
| Presentation of the Testimonial to Lewis Thompson, Esq., M.R.C.E. | 575 |
| Meeting of the Chartered Gas Company | 578 |
| Meeting of the Great Central Gas Consumers' Company | 580 |
| Meeting of the London Gas Company | 581 |
| Meeting of the Sheffield United Gas Company | 582 |
| Portsea | 584 |
| Calcutta | 584 |
| Winchester | 584 |
| The Liverpool New Gas Company | 584 |
| The late Mr. S. Church | 564 |
| Cannel Coal in Van Diemen's Land | 584 |
| *Price Current* | 584 |


## TO CORRESPONDENTS.

Union Jack.—*The "expiring publication" appears, by a parliamentary return of the number of stamps issued to every newspaper in the United Kingdom for the second quarter of this year, to have a monthly circulation of 316 copies! the total number of stamps issued for the three months being 950!! The previous issue for the same periods is stated to have been:—*

1853—*Second quarter* .. .. .. 5000
*Third* „ .. .. .. 2000
*Fourth* „ .. .. .. 1500
1854—*First* „ .. .. .. 2000

*Our advertisers, who are continually pestered with solicitations for their advertisements, will from these facts be able to appreciate the value of assertions about "increasing circulation," &c. &c. What proportion the number of copies sold bears to the number given away, we are unable to ascertain with equal accuracy; but it is quite certain the secret service money of the Coleman-street stags must be heavily drawn upon to keep their organ on its legs.*

A Country Gas Manager *suggests that a little book on the* "Advantages of the Use of Coke in Private Houses," *written in a popular style, somewhat similar to Mr. Rutter's excellent publications on the advantages of the use of gas, would be a great boon to gas companies. The hint is well worthy of consideration.*

## NOTICES.

The subscription is 10s. per annum if paid in advance, or 12s. on credit, payable in two sums of 6s. each, due in June and December of each year. All subscriptions commence from the 10th of January.

All Communications and orders for Advertisements to be addressed to the Editor, No. 3, Parliament-street, Westminster.

*The offices of the Editor are removed from No. 32, Bucklersbury, to No. 3, Parliament-street, Westminster.*

## Circular to Gas Companies.

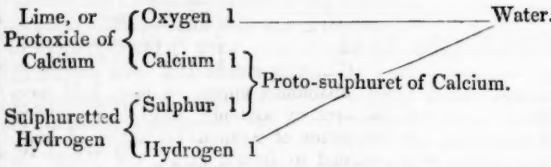
The letter addressed to us by the Rev. W. R. Bowditch, and inserted in another column, is a singular example of the influence which the pursuit of "filthy lucre" exercises in warping the judgment, and perverting its conclusions. This reverend gentleman is patentee of a process for the purification of gas by the agency of clay or aluminous earth, and he presents it to the public as a means of depriving gas of its bisulphuret of carbon. Mr. Lewis Thompson, who had, at Mr. Bowditch's solicitation, investigated the subject, published in our last number a letter denying that alumina or aluminous earth had any action whatever on bisulphuret of carbon; and at this invasion of Mr. Bowditch's monopoly in the circulation of information respecting his "remedy" for "gas poisons," the reverend gas purificator takes fire and challenges us to a chemical tournament. He invites us to a species of arbitration, not upon the original question, respecting which we are at issue with him, but on some other which has never yet been raised by us. No doubt he would like to have the chance of obtaining a favourable report on his process from some of the distinguished individuals he names, and this at our expense; but we apprehend he has mistaken our relative position and duties—he is a patentee, hoping to realise a fortune by the use of his patent, and we are journalists, to whom a large class of manufacturers look for accurate information on all matters connected with our profession. His proper course is to engage any or the whole of the persons he names to investigate his process; and we pledge ourselves to publish any of their reports which may contain full details of the mode of conducting the experiments upon which their conclusions may be founded. We reserve to ourselves, however, full liberty to express our opinion upon the value to be attached to the reports; for after the painful and humiliating exhibition afforded by the scientific witnesses in the Boghead coal and the paraffine oil trials, we are not disposed to accept without examination the *dictum* of any professional man who undertakes an investigation, not as a matter of science, but as a matter of business. Chemists generally are as dubious of the existence of the 206 cubic inches of nitrogen which Dr. Lyon Playfair found in 277¼ inches of Buxton water, as gas engineers are of the 9667 cubic feet of pure gas with a specific gravity of ·731 which Dr. Miller found in a ton of Ramsay's cannel.

We publish in another part of our columns, a report from the medical officer of the City of London, respecting the alleged nuisances created by the City Gas Works, in which report it will be seen that the officer in question (Mr. Simon) has unfortunately undertaken and attempted to execute a task very far beyond his powers. In commenting upon the nature and chemical qualities of the fluid, produced in a wet-lime purifier, Mr. Simon contrives to make the most egregious blunder we ever remember to have met with; and this is the less excusable on his part, inasmuch as that he tells us, he was accompanied on the occasion of his visit to the gas-works by Mr. T. Taylor, a gentleman whose scientific attainments would, if appealed to, have kept Mr. Simon free from the commission of such an absurd statement as the following:—

"Theoretically speaking, this discharge might, perhaps, be inoffensive, for, assuming the action of the condenser to have been complete, and the lime of the purifier to have been in chemical excess, the refuse referred to would consist of an inodorous slush of insoluble proto-sulphuret of calcium, not liable to rapid decomposition in the river water. But this is practically not the case. The blue billy (as it is called) contains many bituminous matters that have escaped precipitation in the condenser, and it is liable (from deficient action of the purifier) to present free sulphuretted hydrogen, or to contain a soluble and fœtid bisulphuret of calcium instead of the insoluble and inoffensive proto-sulphuret. I, therefore, cannot doubt that i s discharge into the Thames must be regarded in the light of a common nuisance, which it lies within your functions to suppress."

Now, the production of this much-condemned "fœtid bisulphuret of calcium" is an utter impossibility under the circumstances; and the only substance of the kind that can be formed in a wet-lime purifier, as used at gas-works, is and must be "proto-sulphuret of calcium." In direct contradiction, therefore, to Mr. Simon, we assert, that the "blue billy water" does not contain a particle of "bisulphuret of calcium." This is a matter of such importance to gas companies in general, and, if left unelucidated, is so likely to produce evil consequences, that we consider it deserving of the most complete exposure. When lime is mixed with water, as in the ordinary wet-lime purifier, it constitutes, chemically speaking, a solution of the hydrated protoxide of calcium, with hydrated protoxide of calcium in

excess. Now, the impurities which such a mixture will remove from coal gas are, carbonic acid and sulphuretted hydrogen, with a little sulphuret of ammonium. The carbonic acid will combine directly with part of the protoxide of calcium to form carbonate of lime, whilst the sulphuretted hydrogen will unite to another part of the protoxide of calcium, with mutual decomposition, and the production of water and proto-sulphuret of calcium, or of what is now sometimes called hydrated proto-sulphuret of calcium, and formerly hydro-sulphuret of lime. The following diagram explains the action:—




To produce bisulphuret of calcium under the same circumstances, would require the employment (not of lime, but) of the binoxide of calcium, a substance which, perhaps, no chemist in England has ever seen, and which would probably cost five guineas an ounce. With this binoxide of calcium it would be possible to make bisulphuret of calcium in a gas-works, but without it no such compound can ever find its way into a wet-lime purifier, the only calcareous compounds in which are, and must be, carbonate of lime, cyanide of calcium, and what Mr. Simon calls "inoffensive proto-sulphuret of calcium." Yet the existence of this impossible "bisulphuret" affords Mr. Simon an opportunity of declaring that he "cannot doubt that its discharge into the Thames must be regarded as a common nuisance." So much for Civic chemistry. Of a truth such reports are fitly confided to a Court of Sewers.

The Great Central Company has increased its dividend from 7½ to 8 per cent. by carrying to capital charges what gas companies generally charge to current expenses. The subjoined statement shows the extent to which this system is practised:—

| | Invested Capital. | Rental. |
|---|---|---|
| June 24, 1853 .. | £213,981 6 10 | .. £23,374 16 9 |
| „ 1854 .. | 219,666 19 9 | .. 23,586 6 6 |
| Increase in 12 mos. | 5,685 12 11 | 211 9 9 |

## THE IMPURITIES OF LONDON GAS.

Is the gas of London "dull and dirty," or is it a fair and honestly manufactured product from coal, like the gas of the provinces? Much has been written and much has been said on both sides of this question, until at last it really seems as if we were approaching the true answer by a process similar to that which solved the well-known problem of the "witty monarch." "Why," said Charles, "is a live salmon heavier than a dead one?" Many were the explanations offered, for no one thought of doubting the fact, until at length a sceptic had the audacity to demand, "But is a live salmon heavier than a dead one?" when the whole truth popped out, and there was an end of the joke.

A few weeks ago our respected contemporary, the *Builder*, desiring, perhaps, to revivify the above "*jeu d'esprit*," most gravely put this question in reference to the metropolis—"Why is the gas so dull and dirty?"—after which, to keep up the "*plaisanterie*," it moralised as follows:—

"London is head-quarters for everything. Then would it not be wise to charge a little more (if necessary) for the article, and purify it better? As it is, we are outdone by the provinces in the manufacture of a great essential of life. Gas is cheap, but it is bad; at least it ought and it might be a great deal better than it is. Housekeepers know how soon their tidy rooms are smeared with it, and all must be conscious how much sooner its heavy affluvium is apparent than in those places where it is consumed in a state of greater purity. Both causes retard its more general introduction throughout private houses."

Since that time, however, some disciple of St. Thomas has "doubted the fact," and altered the query into the form in which we have given it above—"Is the gas of London dull and dirty?" The answer is not far off, for Mr. John Leslie comes forward with a conclusive reply; and we are happy to remark that our contemporary is not inferior to the honesty of giving publicity to statements which for ever stultify his previous assertions, and prove, not only that the London gas is neither "dull nor dirty," but that it is even much purer than the London air in which it is consumed. Those who are willing to tolerate the air may very properly overlook the so-called impurities of the gas; and, if a complaint is to be made, we expect that henceforth it will emanate from the gas companies, and have reference to the contaminations of London air, and not London gas.

All the world knows, or ought to know (for it is no secret), that Mr. Leslie is the inventor or patentee of an effective process for purifying coal gas on the premises of the consumer—a process which we have no hesitation in declaring to be chemically perfect so far as the ordinary impurities of gas are concerned. By its means every atom of ammonia, carbonate of ammonia, sulphuret of ammonia, and sulphuretted hydrogen may be arrested and prevented from reaching the burner. Its great cost is, perhaps, the only reason which precludes it from superseding other modes of purification on the large scale; and, as a check or safeguard against the carelessness or mishaps of our gas-making workmen, we have ever regarded it with an eye of favour. Admitting, then, to the full the great efficacy of the purifying apparatus of Mr. Leslie, it becomes an interesting question to know the amount of these mishaps, or, in other words, what are the nature and extent of the impurities removed by its powerful means from coal gas after this has undergone the ordinary purification routine of the gas works? Fortunately Mr. Leslie has himself supplied, in the *Builder* of the 21st ultimo, the requisite information upon this important topic, where we find in that publication the following letter:—

"PURIFICATION OF GAS.

"The columns of your journal are a constant evidence of your desire to benefit the public and to promote the interest of gas makers, by calling public attention to those improvements which must greatly extend the use of gas as an illuminative agent. Your readers, from your repeated notices, are aware of my patented system of purifying gas on the premises of the consumer, thereby avoiding all those dangerous consequences of the gas passing over the foul deposits in the long lines of pipes between the gas works and the consumer's premises.

"Having had the honour of applying these patents to the extensive offices of the *Times*, in Printing-house-square, and which have now been in operation nearly a year, I thought it advisable, some time back, to request the attendance of the excellent chemist at Apothecaries-hall, Robert Warrington, Esq., to witness the cleansing out of the purifier at the *Times* offices, and to remove, in his presence, the entire contents of it, with a view to the analysis of those contents; also, by photometrical experiment, to determine the illuminating value of the gas so purified, when burnt through the patent tubular gas burner and glass combustion chamber; and, at the same time, to collect the products of combustion of the gas so purified and consumed, and by proper analysis to state the results.

"The following is the substance of his report:—

"'The purifying apparatus was entirely cleaned out in my presence, and the whole of the contents, weighing 40 lb., removed to my laboratory. I found in that quantity of material products equivalent to:—

| | Cubic Inches. |
|---|---|
| Ammonical gas | 17,000 |
| Carbonic acid gas | 10,348 |
| Sulphuretted hydrogen gas | 193 |
| | 27,541 |

"'As some of the condensed liquid products had been accidentally lost, I have no doubt that the above quantities are understated.

"'I also found that your patent tubular gas burner, with a small glass combustion chamber, was consuming 2¼ cubic feet per hour of the cannel gas thus purified, and that the light produced from such combustion, as ascertained by careful photometrical experiments, was equal to eighteen wax candles.

"'The condensable products from this gas were collected for several hours, and yielded, by evaporation at 212° Fahr., 0·006 grains per cent., consisting principally of sulphate of ammonia.

"'Robt. Warrington.'

"Apologising for the length of this communication, I hope its importance will meet your excuse, when one of its facts shows that gas may be burnt, producing distilled water, with six thousandths of a grain per cent. impurity. "John Leslie."

Mr. Leslie has not, indeed, given the quantity of gas from which these impurities were derived, nor have we been able by personal application to him to procure it; and it is quite possible that he may not know the precise amount. This defect, however, has been remedied in another quarter; and we have good reason to believe that the above trifling quantity of impurities was the accumulated collection from 1,403,300 cubic feet of gas; or, in other words, that nearly one and a half millions of cubic feet of gas passed through the purifying vessel, and therefore contained less than sixteen cubical feet of impurity. Put into actual weight, this would represent less than one pound and a quarter of impurity in about 29 tons of coal gas!—the purified product of 170 tons of coals!! After all, however, the only impurity worth calling by that name in the list furnished above is the sulphuretted hydrogen; for the ammonia and carbonic acid would necessarily neutralise each other, and produce that which few will regard as an injurious commodity—carbonate of ammonia, or "smelling salts." The sulphuretted hydrogen, therefore, is our real impurity; and of this it appears there were 193 cubic inches, upon which the total efficiency of Mr. Leslie's box may be said to have expended itself. The next question is, whether so extremely minute a quantity of impurity be worth removing, on the

supposition that its removal costs anything. Suppose, for example, that Mr. Leslie were to charge for the use of his purifying apparatus at the rate of 6d. per 1000 cubic feet of gas, then the expense of removing these 193 cubic inches of sulphuretted hydrogen would be £35. 1s. 6d.! or more than £314 per cubic foot of actual impurity!!

From the argument here adduced, it is clear that we might justly take a chemical objection to the mode employed by Mr. R. Warrington in representing the bulk of these impurities; for it must be obvious to the merest tyro, that the carbonic acid and sulphuretted hydrogen there shown in an uncombined state would unite with the ammonia, and condense into an extremely small space, probably not one-fiftieth of that shown by the figures, 27,541 cubic inches. But we are quite willing to take the very worst possible view of the case, and beg to ask, in conclusion, where that atmospheric air is to be found in London which contains anything like so small an amount of gaseous impurity as 16 cubic feet in 1,400,000. According to De Saussure, the quantity of carbonic acid contained in the air at Geneva was one part in 1000, or 240 times as much as is present in the same amount of London gas. The exact quantity of ammonia in the air of towns is still a problem, but there are very good grounds for supposing it to exceed considerably the proportion shown by Mr. Warrington's analysis; judging from an experiment made some years ago (1841) upon this subject, when a somewhat singular result was obtained. The air was that of a provincial town in France, and it was passed at the rate of about 12 cubic feet per hour, successively, through three Wolf's bottles charged with pure muriatic acid. When 30,000 cubic feet had passed, the acid fluid was evaporated to dryness, and was then found to have left an ounce and a half of muriate of ammonia, slightly contaminated with iron and a kind of slimy organic matter. The proportion of ammonia in this air must, consequently, have been from three to four times as great as that contained in the gas examined by Mr. Warrington; and as to sulphuretted hydrogen, how happy might we not be if it could be demonstrated that even so little as one hundred times 193 cubic inches were contained in a million and a half cubic feet of the odoriferous breezes that in summer fan the exsiccating mud of the Thames! Upon the whole, therefore, the London gas is not only neither "dull" nor "dirty," but it is vastly more pure than the London air in respect to all those agents which are supposed to indicate insalubrity. If, however, we were disposed to agitate the question of sanitary reform, it would be by directing attention, not to the gas, or the water, or the dirt, but to that which must affect the health of all, and from whose contaminations no one can escape, rich or poor, temperate or intemperate, strong or weak—it would be by directing attention to the variations which occur in the composition and chemical properties of the air we breathe. We would ask, what are the impurities of air when examined on the scale of one million cubic feet? What does Mr. Leslie's box arrest out of that? What does it arrest in London, and what on Salisbury Plain? What do other reagents arrest? And, in fine, what is there in the air one day that is not to be found in it on another? There is an annual gathering of "the wise men of the East," called the British Association, which has yet to acquire a character for public utility. Can that association do nothing to assist us in such a dilemma? The subject is surely large enough, or, if not, let ten millions of cubic feet be taken—the more the beter, say we. The result cannot fail to throw much light, not only upon the physiology of health and disease, but also upon the growth and cultivation of plants, or what is called the chemistry of agriculture.

## OUR PATENT SYSTEM.

In a recent number we had occasion to comment upon that comet-like return of patentable ideas, through which one single invention is not unfrequently seen to become the periodical subject of a variety of new patents, just as if it was at the same time so many new discoveries. We shall be able to show, by a few select examples, that this kind of patent plagiarism is vastly more common than the public is aware of; and its great prevalence at the present moment constitutes, in our opinion, one of the strongest arguments in support of the views of Sir William Cubitt, Mr. Brunel, and other men of science, for the abolition of the practice of granting letters patent at all—a practice, be it remembered, originating at a period of our history so opposed in every respect to that which now exists, as to warrant, without further question, a suspicion of its value for the expanded and expanding commercial usages of our day. And when to this we add the well-known fact that the pages of the Repertory of Science and the Arts have themselves furnished, word for word, the specifications of many patents taken out under *altered titles*, we conceive that the propriety of continuing to perpetuate such hindrances to our manufacturing interests must appear still more questionable.

With a view to discuss this important subject upon something like its real merits, we will take a hasty retrospect of the origin of a custom seemingly so much opposed to the practice of our ancestors and to their grand palladium—perfect freedom of action. From the time of the Saxon Heptarchy, down to the reign of Henry VIII., this nation had been essentially military, and its male inhabitants appear to have held every other kind of manufactures in contempt than such as were connected with the fabrication of weapons of war or of hunting; all else was confided to female care; and hence the kingdom suffered a perpetual drain of raw material in exchange for the manufactures it imported, just as happens now with the majority of barbarous or semi-barbarous countries. To prevent this, and also to remedy the fluctuations in value caused by the frequent occurrence of war, the Crown assumed the power of granting monopolies or exclusive privileges to skilled foreigners who brought with them any new or improved manufacture into the country; but this monopoly, from its very nature, as we see, neither was nor could be any injury to the natives, inasmuch as that the settlers introduced something never before practised or known in the island, and eminently repugnant to the genius of the people. The protection or monopoly had its effect, therefore, only upon foreign competitors, and acted as a stimulus to induce skilled labour to take refuge amongst us; it was, in fact, a means of drawing practical information into the country, and enabling the inhabitants to obtain at home, and even during war, those things which they could only procure from abroad during the times of peace. No one can doubt for a moment that, under such circumstances, this was a wise and beneficial policy; and so it must have continued until the manufacturing intelligence of this kingdom began to equal that of other neighbouring countries, when its utility would become doubtful. Accordingly, we find that, after the cessation of the wars of York and Lancaster, this system of monopoly began to grow obnoxious; and in the reign of Elizabeth it had so entirely ceased to maintain its original character, that grants of exclusive privileges were then, what ministerial places are too frequently now, a means of favouritism or corruption. The warlike nature of Elizabeth's reign diverted for a while the public attention from this evil, and it was not until the more peaceable government of James I. that its mischievous tendencies attracted the notice of Parliament. The famous Monopolies Bill (21st James, c. 3, s. 6) was then passed, which declares all monopolies null and void, and defines the royal prerogative, as regards letters patent for "any manner of new manufactures," the terms of such patents being "limited to fourteen years." This, then, was in itself merely an attempt on the part of Parliament to restore the granting of monopolies to something like its original condition—that is, to "any manner of new manufactures," with the new restriction added as to time. But it is abundantly apparent, from the great interest which the question then excited, that Parliament only intended such grants to apply to matters of importance—to "any new manufactures" which, being unknown and unpractised in the kingdom, were, nevertheless, important enough, in a national point of view, to constitute an object worthy of the royal consideration. In such cases, Parliament was willing that the Crown should grant an exclusive privilege; but, to show the growing dislike to this species of reward, that privilege was limited to fourteen years. There can be no doubt that Parliament then never dreamt of the use which is now made of what it clearly meant to be a very restricted prerogative; it never dreamt that patents were to be granted by the thousand, and, as a matter of course, upon the mere application of an inventor, the man of all others least capable of correctly judging the value of his presumed "new manufacture." Had Parliament done so, it could only have added to its folly by declaring at the same time that every inventor should have a pecuniary reward from the public treasury, and be himself the judge to decide how much that reward should be. Very different, however, is the conclusion to be drawn from the reading of this "act;" and, bearing in mind the cause of that convulsion which dethroned the succeeding

monarch, it is obvious enough that this celebrated "monopolies' statute" was really the beginning of a movement to limit the then ill-defined prerogative of the Crown.

But, granting that the Parliament of James I. saw good reason for the continuance of these temporary monopolies, it by no means follows that the same system may be continued advantageously at the present day. From what has been before stated, it is but fair to infer that, if the granting of these exclusive privileges were beneficial to this country when its inhabitants had a repugnance to, and want of, knowledge in manufactures, now, when these conditions are entirely reversed, an opposite condition of things will follow, and more especially so under the prevailing influences of free trade. Nine times in ten the object of an invention is not to make a new article, but to make an old and well-known article in a new or improved way; consequently it cannot be known by simple inspection how this article has been produced; but probably in this country a dozen patents exist for the production of the object alluded to, none of which extend to other countries or to our colonies, where, it is needless to say, this very article can be made free of patent right annoyance, and sent amongst us for sale, to the manifest injury of the home manufacturer. Or, take the case of a foreign production, the fabrication of which may have been no secret abroad, but caught up and patented in this country by one of the many individuals whose business it is to earn, in this way, a precarious existence —the manufacture of this article becomes forthwith almost impossible in Great Britain, except at a very great disadvantage. Hitherto we have been speaking of *bond fide* patents, grants for real improvements, and the action of which, in the present state of our manufacturing industry, we believe to be injurious; but what shall we say to the thousands of sham patents—the mere "comets" of the Enrolment-office? Those parchment phantoms, which have no substantial existence except in the fears or ignorance of individuals who pay for their "unreal" privileges—what can we say of them, except that they are an overwhelming proof of the rottenness of that system which has led to their production?—a proof that it is more calculated to encourage unscrupulous schemers than advance the cause of our manufacturing interest. In fact, if a trustworthy profit and loss account could be had, showing the amount of money honestly gained by patentees, the amount of damage dishonestly inflicted upon our manufacturers, and the enormous sums expended in our law courts in connection with patents, the public would rush clamorously to the House of Commons, and demand the immediate extinction of a practice fraught with such prodigious mischief, and capable at best of doing so little good.

Volumes might be filled with examples of the "comet-like" return of patents connected with the manufacture of gas; but it will suffice for our present purpose to cite a few of the most remarkable instances in which patents have laid dormant for longer or shorter periods, and have then again seen the daylight under some new patentee. On reviewing what has been done in respect to the production of water gas, we find a patent of Mr. George Lowe, dated May, 1832, which evidently embodies what has since been attempted, so far as economy and rapidity of production are concerned. It speaks, indeed, for itself in this respect; and therefore, without needlessly commenting upon its details, we subjoin an extract from it, as follows:—

GEORGE LOWE, civil engineer of the gas works, Brick-lane, St. Luke's, Middlesex, for "*Certain improvements in and connected with the manufacture of gas for illumination.*" French patent dated May, 1832.

The sixth head of this patent is for an application of a new apparatus to retorts, coke ovens, or furnaces of gas works, for the purpose of receiving the hot coke drawn therefrom, and generating gas by means thereof; which apparatus, and a modification thereof, are applicable to the general manufacture of gas from water and other suitable substances, thereby saving the expense of retorts.

"The apparatus consists of a cylinder of wrought or cast iron, and must be made of such dimensions that, when lined internally from top to bottom with fire-bricks, it shall be fully able to contain the charge or quantity of coke about to be drawn from the retorts, coke ovens, or furnaces adjacent to which such cylinder is placed. There is a grating, or set of fire-bars near the bottom of the cylinder, for the purpose of increasing or keeping up the heat of the coke, as hereinafter described. A lid, or cover, is fastened up against the bottom of the cylinder, in the ordinary mode of fastening the lids of retorts, to prevent the access of air to the grate or fire-bars when necessary; and a similar lid at the upper part of the cylinder, with an induction pipe, for whatever matter may be introduced for the purpose of generating gas; and an eductor, or exit pipe, for the said gas to pass out to a condenser or other apparatus. The eduction pipe may be a three-branch pipe, the utility of which will be described hereafter. A hopper, or feeder, is supposed, in this form of apparatus, to be placed under the floor of the retort-house, and in front of a bench of retorts, so as to receive the coke when drawn from the retorts, and conduct it into the cylinder before mentioned; but this hopper forms no part of my new apparatus.

"Having now described the said new apparatus, the patentee proceeds to explain the manner of using the same. Having removed the lids, he fills the cylinder with hot coke from the retorts through the hopper. The lower lid being off, the atmospheric air will rush up the cylinder, and greatly increase the temperature of the coke; and the nearer this heat approaches a white heat the better. When the greatest possible heat is obtained by this means, or when the upper portion of coke has attained a bright red heat, close both the lids, and turn on the steam: this will, of course, cause gas to be generated, which will be passed off at the eduction pipe. If the gas made in this manner be produced from steam, it is evident that it will not pass off from the cylinder in a state fit for illumination, but must be subsequently submitted to the process of saturation, mixing or impregnating with the vapour of naptha, or any other suitable substance, as described under another head of the invention, in order to render it fit for use.

"The advantage of making the eduction pipe a three-branch pipe would be to prevent a useless expenditure of heat, by opening the upper branch first; and, when gas ceases to be produced from the upper portion of the coke, then by opening the next branch below, and so on to the lowest branch, stopping the upper ones as those below are opened. And when a sufficient quantity of red-hot coke cannot be obtained in the manner aforesaid, I make use of one or more furnaces. I prefer four combined together, very similar to such as are at present known in the laboratories of Great Britain by the name of Knight's portable furnaces, which are made both round and square, of various sizes or dimensions, of either wrought or cast iron, and lined with fire-clay bricks, or other combustible substance, which are also bad conductors of heat. The fan of this furnace may be either a short cylindrical column or that of a square column—which last I prefer when four are combined—the height being three or four times that of its diameter. My object in having four combined is, the certainty it affords of always having at least one hot enough for action. The outer case of wrought or cast iron should be made air tight, or nearly so; and also the ash-pit, and furnace doors, and other moveable parts should be capable of being made air-tight, or nearly so, by means of any of the usual lutes used in gasworks or laboratories. The more air-tight the various parts or joinings of the the outer case and its door or doors are, the less will be the escape of gas when the furnace is in use.

"The patentee then proceeds to explain the mode of producing gas from water, steam, and other suitable substances, by the aid of such furnace or furnaces. The fire being lighted on the bars of the furnace or furnaces, and the draught of the chimney applied, and the body of the furnace being presumed to be filled with either coke, charcoal, or other suitable fuel, and to have obtained that state of combustion called red hot at the top of the fuel, yellow hot in the centre, or white hot near the bars, then the furnace is in a proper state for decomposing water or steam of water, or other suitable substances; but he prefers steam of 212° or more of temperature of Fahrenheit's thermometer, which steam may be introduced into the furnace either through its ash-pit or at the top part, which latter he greatly prefers; and the gases resulting are to make their escape at the different exit-pipes in rotation, in the same way as before described, taking care to stop off the introduction of steam as soon as the production of gas ceases, at which time the furnace will not have become so much reduced in temperature as to be unable to be rekindled on the admission of fresh air through the ash-pit door or other opening; and the reapplying the draught of the chimney will soon cause the furnace to acquire its original temperature, when the process of gas-making may be renewed. The gas thus produced may be conducted by pipes to a condenser or other apparatus, and thence to the gasholder, from whence such gas can be used for the purpose of giving light after it has been saturated, impregnated, or mixed with naphtha or other substances, as described under another head of the invention."

Under precisely similar circumstances may be noticed two patents taken out in England by M. Mollerat, of Dijon, on Sept. 25, 1834, and May 2, 1837. These patents have been the production of a mind well versed in the chemistry of the question, and remarkably "*au fait*" to the practical working of the subject. The nature of the various forms of hydrocarbon required for naphthalization, and the means of obtaining and purifying them, are described in a manner which would do credit to any chemical professor of the present day; and the patentee seems to have been the first to notice the practical fact, that it was necessary to pass the gases resulting from the decomposition of water through "red-hot charcoal," in order, as he says, "that the carbonic acid may become charged with carbon, to be converted into carbonic oxide;" at which time the hydrogen and carbonic oxide are produced in equal quantities.

These patents of Mollerat, which we subjoin, are well deserving of a careful perusal:—

JEAN BAPTISTE MOLLERAT, manufacturing chemist, of Dijon, then residing with Sir John Byerly, Whitehead's-grove, St. Luke's, Chelsea, for "*Certain improvements in the manufacture of gas for illumination.*" Patent dated Sept. 25, 1834.

The patentee thus describes his invention:—

"My invention consists in utilising the vapour of certain volatile liquids, which are very rich in carbon, to render luminous various gases which are not so, though they are combustible. I employ for this purpose several volatile liquids hereinafter named:—1. The very volatile liquids obtained from the distillation of the tar produced in the manufacture of gas or coke. The tar distilled at a gentle heat furnishes an oil composed of the sesquicarburet and the bicarburet of hydrogen, containing generally in 100 parts, 91·2 of carbon and 8·8 of hydrogen. It is known that the sesquicarburet of hydrogen contains 90·02 of carbon and 9·93 of hydrogen; and the bicarburet, 92·35 of carbon, and 7·65 of hydrogen. Each of these two bodies boils at 136° Fahrenheit, and possesses a very great elasticity. Their density is the same, being 0·86, water being 1· at the ordinary temperature. The liquid I employ will support a degree of cold equal to the zero of Fahrenheit without solidifying, which proves that it contains a sesquicarburet which remains liquid at that low temperature, while the bicarburet becomes solid at the freezing point of Fahrenheit. Coal tar produced in the manner above stated yields 10 to 12 per cent. of the volatile oil above mentioned, proper for the use of my patent; but the

first product of this distillation is the only one proper to be employed for that object without being rectified. What comes over afterwards is mixed with an oil that boils only at 212°, and also contains naphthaline, which only boils at 380° Fahrenheit. If this second product were employed, a second distillation would be necessary to get rid of the oil and naphthaline in an apparatus on the principle of that of Woolf. If coal were distilled for the express purpose of obtaining the volatile oil, a greater per centage than the above would be produced.—2. The natural products known under the names of naphtha, petroleum of Malta (mineral pitch), asphaltum, and bitumens, whether those matters were found in a mixed state in sandstone, silicate, or limestone, or in a liquid state, or procured by the distillation of those mineral products. Those matters are all formed of of carbon and hydrogen, but can only be employed after being rectified, so as to boil at about 212° Fahrenheit.—3. The oil obtained by the distillation of caoutchouc. The first oil that comes over in this distillation at the ordinary temperature possesses considerable illuminating power. I also employ any other oils which are very rich in carbon, and volatile enough to boil at 212° Fahrenheit.

"The gas which I render luminous by the addition of any of these oils is either pure hydrogen or a mixture of hydrogen, carburetted hydrogen, and carbonic oxide. These I obtain by the processes described in all treatises of chemistry—either by the decomposition of water by means of iron or zinc, and acid, or by means of iron at an elevated temperature. The gas which I prefer is that obtained in passing steam over red-hot charcoal, reduced to a state of dust or powder, or over red-hot coke. This gas is a mixture of hydrogen, carbonic acid, carbonic oxide, and carburetted hydrogen, in variable, quantities according to the mode of operation. When the apparatus is only gently heated, there are produced hydrogen, with carbonic acid, and a small quantity of carbonic oxide. When, on the contrary, the apparatus is properly heated, and if the gas passes over a great excess of incandescent charcoal before it arrives at the gasometer, it would produce hydrogen, with carbonic oxide, and little or no carbonic acid. This gas may be produced in retorts similar to those used for making coal gas, but I prefer an apparatus consisting of one or more retorts, with a partition in the middle through the whole of the length. Those retorts, filled with charcoal, are placed horizontally in a furnace, and so disposed that the steam of water passes through the whole length of the under half of the retort, and returns through the whole length of the upper half, into a pipe leading to the gasometer. This mode is adopted in order that the water may be forced to pass through a great mass of red-hot charcoal, and thus produce the least possible amount of carbonic acid, and the greatest quantity of carbonic oxide. Instead of the partition above named, retorts may be connected together with pipes, so as to obtain the same effect. The retorts may also be placed vertically. In this case, receivers or vases holding charcoal should be adapted to the upper end, closing hermetically, and thus furnish a supply of charcoal to the retort as it is wanted. When the gas is thus prepared, there is no occasion to wash it, as it will be then almost entirely composed of *hydrogen and carbonic oxide in nearly equal portions*, and a certain quantity of carburetted hydrogen. To render the gas luminous, a current from the gasometer is passed into a vessel containing one of the volatile oils mentioned above. A part of the oil is converted into vapour, and carried off by the gas; and, even before the gas has taken up enough to be saturated, it has acquired a luminous quality sufficient for the purpose of lighting. When the temperature of the atmosphere is below 60°, the vessel containing the oil must be warmed until it has attained that temperature, which may be done by a small pipe from the gasometer placed under it, and firing the gas; or by keeping the vessel in warm water, maintaining it at the temperature of 60° at least. The vessel containing the oil ought to be so arranged that the gas which arrives will always take the same quantity of volatile oil, which then passes into a service-pipe for use. The volatile oil will be mixed with the gas in its passage from the retorts to the gasometer, or in the gasometer itself; but I prefer the first method as most advantageous. One pound of charcoal will produce at least sixty cubic feet of gas, and each cubic foot of gas requires from forty to fifty grains of the oil distilled from coal-tar. Two pounds of water furnish, by its decomposition, about 800 gallons of gas.

"I claim as my invention—the method of decomposing water by charcoal, so as to be free from carbonic acid gas without washing, which previously was always indispensable.

"I claim, also, the having ascertained by direct experiment the chemical and physical qualities of the volatile oils necessary for rendering water gas luminous, and supporting the changes of temperature, inasmuch as they must be in the state of a sesquicarburet, and boiled at a temperature inferior to that of water.

"I also claim as new, the having determined the quantity of volatile oil necessary to be combined for a given quantity of water gas, to render it highly luminous.

"I likewise claim as my invention, the method of combining the volatile oils and the water gas, as well as the temperature at which those oils should be maintained, in order to their being taken up in a sufficient quantity by the gas before it passes into the service-pipes."

Jean Baptiste Mollerat, manufacturing chemist, then residing at 27, Leicester-square, for "*An improvement or improvements in the manufacture of gas for illumination.*" Patent dated May 2, 1837.

"The nature of my invention is comprehended under two heads—First, the formation of the gas; and, secondly, of processes for supplying one of the carburetted matters, the employment of which in the formation of the gas is indispensable.

"The gases hydrogen and oxide of carbon not being of themselves sufficiently luminous in their combustion, it has been suggested, as a means of enriching them with carbon, to cause them to pass over carburetted matters, such as the oil obtained by the distillation of pitcoal (subsequently rectified), or other oils of a similar nature.

"In the cases of the gases hydrogen and oxide of carbon being saturated with those carburetted matters by absorption, they were capable of affording a good luminous gas so long as they were kept at a sufficient temperature; but, when owing to the reduction of the temperature, to their remaining too long in the gasometers, or to their friction against the sides of the conducting tubes, the carburetted matters were separated from the gases hydrogen and oxide of carbon, the remaining gases consequently ceased to be so luminous as they were before their union with the carburetted matters.

"It has also been attempted to render the gases hydrogen and oxide of carbon more luminous by employing burners of a peculiar form, adapted to contain carburetted matters—such as raw oil produced by the distillation of pitcoal, the same oil rectified, or other oils of a similar nature, which, mixing with the gases hydrogen and oxide of carbon during their combustion, rendered them more brilliant. But this method, which is more speculative than practical, cannot be brought into use on account of the care and attention which it would have required from the consumer, who would have been obliged to keep a sufficient quantity of carburetted matters in each burner, to preserve a uniformity of light.

"Hence it has become necessary, in order to render the gases hydrogen and oxide of carbon suitable for illumination, not only to enrich them with carbon to make them brilliant, but also to render such richness in carbon permanent; and likewise that the distribution and consumption of the new compounds should not require any extraordinary care and attention. These desiderata I have realised, and I will proceed to explain, first,

"The process of obtaining my newly invented gas.

"The new gas which I produce is not a mixture or a saturation of carburetted matters in the gases hydrogen and oxide of carbon, the luminous properties of which may cease from the causes I have pointed out, but it is a new combination not heretofore discovered, and absolutely permanent. This combination takes place at the instant in which the gases hydrogen and oxide of carbon, being raised to a high temperature, come in contact with the oils, whether mineral, vegetable, or animal, reduced in the state of vapour, or decomposed by the action of fire; whence it results that a given quantity of oil, which, decomposed by the ordinary means, would only produce one volume of luminous gas, serves, by this means, to produce three volumes of gas equally luminous. This new combination forms a less volume than that of the gases hydrogen and oxide of carbon on one side, and, on the other side, those proceeding from the decomposition of the oil. Thus, whether hydrogen gas be produced by the decomposition of water by means of red-hot metal, or by the action of an acid with a metal, or whether it be produced by the distillation of wood, or any other vegetable, mineral, or animal matter, or by a mixture of the vapour of water with hydrogen gas, carbonic gas, or the gas oxide of carbon—or, lastly, whether these gases be produced by the decomposition of the water coming, either in a state of liquid or a vapour, in contact with mineral, vegetable, or animal charcoal in an incandescent state—these gases must be forced to continue passing through red-hot coal, in order that the carbonic acid may be charged with carbon to be converted into oxide of carbon; and, in order that it may arrive afterwards with a very high temperature in contact with any kind of oil in a state of vapour, to form at length the new gas, perfectly luminous and permanent, which is received, like other gases for illumination, in gasometers, to be distributed for consumption. By the terms, 'mineral, vegetable, or animal oil or grease,' I mean everything that bears the name of oil, grease, tar, asphaltum, bitumen, petroleum, resin, &c., which may be decomposed at a high temperature, and produce combinations of carbon and of carburetted hydrogen. My new gas for illumination does not require washing, because it does not contain a sufficient quantity of carbonic acid to be prejudicial to its brilliancy; neither does it contain sulphur or ammonia, which circumstances adapt it to be burnt in close rooms, and against metallic regulators, as it does not injure colours, nor tarnish metallic bodies, more than any other natural or ordinary light. Likewise this new gas produces no smoke, and emits but very little odour.

"In the apparatus by which I produce this new gas, I employ, first, two cylinders, heated by elevated furnaces which are so arranged that the current of heated matters is caused to descend through suitable flues, and envelop the external furnaces of the cylinders prior to their being discharged into a lofty chimney. Six cylinders are placed vertically in masonry, and are heated by means of two furnaces at opposite sides for convenience. These furnaces are provided with four doors. The current of heated matters, after operating upon the front sides of the cylinders, turns round at their lower end and ascends, running into contact with the backs of the cylinders before it enters the middle chimneys. The cylinders, having been filled with bulky combustibles (such as coke, charcoal, or wood), are then securely boxed up. The lower ends of the cylinders are furnished with a grating, which is designed to prevent the combustibles from descending into the narrow prolongations of the cylinders, and to prevent its obstruction, which would be dangerous, as it is through this prolongation that the gas has to pass. Three cylinders are united and worked together, and two smaller reservoirs surround the middle chimney. These are respectively supplied with water by funnels and pipes, to be reduced into vapour, and afterwards conveyed into the first cylinder of each set. Oil is poured into these funnels, whence it ascends, through the small tubes, into a small iron vessel, contained in the third cylinder of each series, wherein it is decomposed. The vapour of water is decomposed in its descent through the ignited matter contained in the first cylinder. The produce of this decomposition continues to pass by a cross tube, then ascends the second cylinder to pass through the incandescent combustion, and arrives at an upper cross tube with a high temperature, and, entering the third cylinder, it comes into contact with the vapour of the oil, by combining with which the luminous gas is formed. In continuing to traverse the incandescent matters contained in the third cylinder, it descends into a vertical pipe, the lower end of which is open; but, as it is submerged in a vessel full of water, the gas cannot escape. The oil and water only, which might not have been converted into luminous gas, would flow out in a liquid state.

"I now proceed to describe my process for obtaining one of the carburetted matters, the use of which is necessary in the preparation of my new gas.

"Nature has produced an abundance of matter, the use of which has been overlooked. This matter is bituminous schistus. It exists in vast quantities in England, and can be obtained at very little expense. This schistus contains an oil which is extracted by distillation. The combination of this oil with the gases hydrogen and oxide of carbon greatly enriches the brilliancy of the light produced by the combustion of the two latter gases.

"The arrangement of the apparatus which I recommend for the distillation of the bituminous schistus is after the manner of that which I have now actually at work. The apparatus consists of two cylinders, made of cast or wrought iron, which are vertically posited in a circular arrangement, and in connection with a series of furnaces, the flues from which, after enveloping the cylinders, proceed through lateral apertures into a vertical chimney in the centre of the pile. There are three pairs of furnaces, each pair of furnaces consisting of one that operates on the upper ends of the cylinders, and another situated directly underneath that operates on the lower ends of the cylinders. Only one pair of these furnaces is lighted at a time in the commencement of the distillation, after which they are to be successively brought fully or partially into operation, as hereinafter explained. Bituminous schistus, broken into small pieces, is introduced into each of the cylinders through openings or mouths at the top of each, and the cylinders, when filled, are hermetically sealed. A tube of sheet iron, kept in its place by three radiating rods, which divide the cylinder into three compartments, is introduced into the cylinders, in order to force the gas or oleaginous vapours to pass through the mass of the

schistus before it disengages itself; and this passage of the gas and the vapours facilitates the operation of heating. It will be noticed that the current of heated matters proceeding from the pair of furnaces envelop in succession ten of the cylinders before it is discharged into the lateral flues leading to the central chimney. After the heat from the pair of furnaces has thus been continued for the requisite time, and the first four cylinders have attained a sufficient temperature *to exhaust the schistus of its oil*, these four cylinders are to be insulated from the others by shutting a refrigerator or damper. The pair of furnaces by which the second set of four cylinders are heated, is now to be kindled. The four insulated cylinders are then to be discharged by means of the valves or apertures at bottom. The discharging apertures being again well closed, the cylinders are recharged with fresh schistus at the top, and are then ready for the renewal of the distillatory process. The register is then opened, the effect of which will be that the current of heated matters proceeding from the pair of furnaces will envelop also the ten cylinders, being four more in advance, and will be discharged into the lateral flue that proceeds to the central chimney. The same power is adopted with respect to the other set of cylinders, which are insulated in like manner. The whole twelve cylinders having been worked out and recharged, they are all nearly under the same circumstances as when the operation commenced; and this operation is rendered continuous by working in the same way to that described, round and round the entire circular arrangement of this distillatory apparatus. On the top of each of the cylinders is an aperture, having a pipe provided with stopcocks fitted thereto. Through these pipes the oleaginous and aqueous vapours, and also the hydrogen gas (which is inevitably produced), escape, by passing thence down a vertical tube into a general conduit to be at bottom, which leads into a refrigeratory. From this refrigeratory there is a tube leading into a general reservoir, from which the oil is caused to flow into a recipient, and the gas proceeds from the general reservoir by means of a tube into a gasometer. The gas thus collected may, if required, be applied to the purpose of illumination; but, if the gas be not so required, it may be conducted from the gasometer through a tube into a furnace, where it will inflame, and thereby economise the consumption of the other fuel employed.

"*Claims.*—1. The new combination of liquid or aeriform substances which I have specified for producing my new luminous permanent gas, whether produced by the apparatus described, or by any other that may be found effective for that combination.

"2. The peculiar apparatus I have described for the continuous distillation of bituminous schist, &c."

The perusal of these specifications irresistibly forces upon us the conviction that had Val Marino, Radley, White, Croll, Webster, Barlow, Hills, Kirkham, and the numerous body of later water gas inventors, been cognizant of what their predecessors had done, parchment and wax would not have been wasted to the extent they have been on more recent patents and specifications.

Again, on the 26th of January, 1843, a patent was granted to Mr. Winsor, for an improved mode of burning gas, so as to increase its illuminating power, which the patentee effected by using two glass cylinders arranged concentrically, and closed at the lower part, so as to cause the air which supplied the flame to pass between the outer and inner cylinders, and thus become heated ere it reached the burning gas, by which its cooling influence upon the flame was prevented, and an increase of light obtained. Unfortunately, it turned out in practice that the inner glass, from the high temperature to which it was subjected, became opaque after a short time, and intercepted the light. The invention, therefore, went out of use. On August 12, 1852, Mr. Laming took out a patent for the employment of the same invention with this difference, that Mr. Laming proposed to make the inner glass cylinder of a very infusible glass not liable to change by heat, thus obviating the cause of failure in Winsor's arrangement, and therefore effecting an improvement upon his patent, which improvement might, no doubt, be worked under a licence from Winsor, with general advantage. Strange enough, however, we not only find a comet patent upon this principle, but what is worse, a comet patent embracing only that part of the invention which had failed and fallen into disuse. In our number for September, there may be found the specification of a patent granted to the Rev. W. R. Bowditch, which is almost word for word the same as Winsor's, and evidently so with respect to principle. This inventor proposes to "pass the air for combustion between two glass chimneys, the outer one of which rests upon the glass or metal bottom, fitting air-tight at its junction with the gas-pipe or burner, and the air is, consequently, caused to pass over to the top of the outer glass, and to descend between it and the inner glass, and through the space at the bottom into the flame, which it reaches in a highly heated state."

Again, in last month's number, we gave the copy of a specification for purifying gas by means of ammonia, which practically is a *verbatim* copy of a patent granted to Mr. Laming on Sept. 13, 1853, for the same purpose. Similarly Mr. Wm. Malam recently patented an improved form of retort with a ridged or corrugated bottom, precisely the same as the form patented by Mr. Bower two years previously—a form, which it will be seen from a letter in our present number, has been used by Mr. King in Liverpool for the last sixteen years.

# Communicated Articles.

## THE "CLAY PURIFICATION" PROCESS.

SHORTLY after the launching of Dr. Letheby's notorious "oil-of-vitriol" bugbear, the gas engineers and managers of the United Kingdom were inundated with circulars from the agent of the proprietors of a gas purifying patent, in which it was alleged that clay or other aluminous earth not only removed the bisulphuret of carbon and other impurities from coal gas, but that the illuminating power of gas purified by this agent was increased "from 22 per cent. upwards." At a later period the attention of the public was directed to the same subject by a series of articles in the *Mining Journal*, subsequently reprinted in a pamphlet entitled "*Gas Poisons and their Remedy*," "to be had of all booksellers, and at the railway stations;" and more recently an unwarrantable attempt has been made, by means of circulars, addressed by the agent of the patentees to every gas company in the United Kingdom, to drag me into a confirmation of their assertions, whereas my experience completely contradicts them. The imputations thrown upon my candour and motives in the last-named circular liberate me from the restraint which I should otherwise have felt was imposed upon me, in regard to a matter upon which I had been professionally consulted; and I am very unwillingly compelled to lay before the public in these columns the history of my connection with the patentees of this process.

On the 28th of March of this year I received a letter, of which the following is a copy:—

"*St. Andrew's, Wakefield, March* 27, 1854.

"Sir,—I shall feel obliged by your inserting the enclosed regularly in the GAS JOURNAL till countermanded. You have, doubtless, heard, through * * * *, of the Huddersfield Works (who has been hither to inspect the process), of the clay purification. I shall be glad to know whether an article on the subject will be acceptable for the next number of the JOURNAL. Should it be, and the enclosed not be sufficient *data*, I shall have pleasure in furnishing you with one. We propose to have the process fairly tested and certified by yourself and another eminent gas engineer, so that its merit may not rest upon our testimony only. Would it suit you better to try the plan in town, or to run down to Wakefield? In haste, "Yours truly,

"T. G. Barlow, Esq." "W. R. BOWDITCH.

The writer was an entire stranger to me; but, judging from the documents enclosed in his letter, that the investigation would be more satisfactorily conducted by a chemist than by an engineer, I replied in the following terms:—

"*London, March* 28, 1854.

"Sir,—I am obliged by your favour of the 27th, and should strongly advise you to engage Mr. Lewis Thompson to undertake a series of experiments in Wakefield upon your purifying process; and I shall be happy to publish his report in the JOURNAL OF GAS LIGHTING. No one is so well able to undertake such an investigation, or whose report would carry more weight with the parties who might employ it, if the process was found to answer.—I am, Sir, your obedient servant, THOMAS G. BARLOW.

"The Rev. W. R. Bowditch, Wakefield."

Mr. Bowditch's reply proves that he was not quite the stranger to Mr. Thompson's subsequent experiments which his letter of the the 11th ult., inserted in another column, insinuates him to have been:—

"*St. Andrew's, Wakefield, March* 29, 1854.

"Sir,—I beg to thank you for your suggestion, and to inform you that I have written by this post to Mr. Thompson, to inquire his terms for coming hither to report. I hope to have the benefit of his recommendation.

"Yours faithfully, W. R. BOWDITCH.

"T. G. Barlow, Esq."

I heard nothing more from Mr. Bowditch till I received a visit from him on, I believe, the 7th of April. He informed me that he had been in correspondence with Mr. Lewis Thompson, and had come to London to direct some experiments at one of our largest metropolitan gas works, where Mr. Thompson had made arrangements for a trial of his process. My own engagement prevented my accepting his invitation to be present at these experiments; but Mr. Bowditch subsequently called upon me and confirmed Mr. Thompson's report of their entire failure, asserting, however, his belief that the failure was owing principally to the smallness of the scale upon which they were conducted. I told him that I could see no reason why his material should be more active upon large volumes of gas than upon small ones; that the operation was entirely a chemical one; and that, in such purifiers as I understood had been used, the gas was exposed to a larger quantity of his purifying material, and for a longer time, than could possibly be the case in operating upon the large scale. He, however, maintained that it was really otherwise at Wakefield, and he renewed his request that I would, at my earliest convenience, visit the gas works of that town, the purifiers of which were so constructed that a portion of the gas could be purified by lime, and burnt against a portion purified by the new process. After much solicitation, I acceeded to his request, and arranged to be in Wakefield on the 20th of the month, taking with me whatever apparatus might be necessary for determining the relative illuminating power of the two gases. In consequence, however, of some neglect on the part of the railway company, my apparatus, consisting of two experimental meters and a 100-inch photometer-rod, was not delivered till late in the afternoon of the 21st, and was not fixed till early on the morning of the 22nd.

My first care was so to adjust the water in the meters that the in-

dices registered equal quantities when the gas was passed from one meter to the other; this was effected to within half a per cent., and two burners were selected which gave equal lights for equal consumpts of gas. I took no note either of the retorts in use, or of the quantity of gas made *per diem*, but I believe the former were from 40 to 45 in number, partly of clay and some of iron. The condensing apparatus was extremely inefficient, and scarcely merited such a designation; but two small vessels, which had once been used as dry-lime purifiers, had been converted into scrubbers, and, being filled with breeze and moistened with water, they materially added to the refrigeratory powers. The purifiers consisted of three vessels of considerable dimensions, in connection with an hydraulic valve, by means of which any one of them could be isolated. Each box contained eight tiers of sieves. The first vessel was filled, for the purposes of my experiment, with ordinary slaked lime; the second one with clay and lime, alternating in the following series: clay—lime—clay—lime—clay—lime, and finished with two clay tiers. This clay was of the yellow ochry colour common in the coal and iron measures, the peculiar colour being caused, in all probability, by a considerable portion of oxide of iron. It had been recently excavated from a gasholder tank in course of construction, and out of which an excellent quality of fire clay was being dug at the period of my visit—a material which I suggested contained alumina in larger proportions than the clay they were employing for purification. I was, however, told that it had been tried and did not answer.

By means of a service-pipe inserted in the main pipe between the first and second purifier, and another service-pipe inserted in the outlet from the second purifier, the gases, both before and after undergoing clay purification, were conducted to a darkened chamber, in which were fixed my two experimental meters, and the photometer adjusted, as before described. Everything being in order, I commenced my experiment at 18 minutes to 8 o'clock on the morning of April 22, the state of the meters having been carefully noted. Twenty-eight retorts had been just charged; and, for the first five minutes the indications of the photometer were irregular, till the gas from the spent charges had been expelled from the different vessels by the gas from the new charges; at 13 minutes to 8, this had been effected, and the photometer then indicated an advantage of two per cent. in favour of the gas after its passage through the second purifier; and so it continued, without the slightest appreciable variation, till ¼ before 10 o'clock, at which period the two meters were again compared, and found to have passed precisely equal quantities of gas in the same time.

At 11 o'clock I repeated the experiment, with the same result, the advantage being again 2 per cent. in favour of the gas from the second purifier; but in this second trial the consumption of gas slightly varied, that from the first purifier being 2·495 feet in 35 minutes, against 2·5 feet from the second purifier.

The patentees and the foreman of the works witnessed all these experiments, and verified their accuracy at every stage. Some one or other of them proved the uniformity in the registration of the meters; the exact equality in luminiferous properties of the burners used; the comparative illuminating power of the two gases, and the uniformity in the quantity consumed during the experiments. From that day to the present time I have never heard a doubt thrown over their perfect accuracy and fairness; and I am astonished that, in the recent circular of the agent for the patentees, these experiments should be ignored. Mr. Bowditch, however, thought it would have been more satisfactory had I operated upon what he called the "nascent gas," instead of subjecting gas already purified by lime to the clay process; and I pointed out how this might be effected, by reconverting their present scrubbers into lime purifiers, in which these might purify as much gas abstracted from the whole make as would pass through a ¾ or 1 inch pipe, receiving it in one of their light gasholders, which was at the time out of action, and testing it against the rest of the gas purified by the clay process. This suggestion was approved of by all parties, and I promised to revisit Wakefield on the first convenient opportunity, for the purpose of repeating my experiment on the gases thus purified.

Before leaving the works, the chairman of the company requested me to ascertain the illuminating power of the gas then being supplied to the town. I had previously been shown a book containing what purported to be a register of similar observations made by a resident in the town; and, so far as I can recollect, they varied from 15 to 17 standard sperm candles for the 5-feet argand burner, which was a Dixon double cone one, of (I believe) 12 holes. I found, however, that, to do justice to the gas with this burner, it was necessary to increase the consumpt to 5·52 feet per hour; and this gave a light equal in intensity to 12·79 sperm candles of 140 grains consumpt, equivalent to 13·51 candles of 120 grains for the 5-feet burner. The chairman observed, that this was considerably below the usual value; and, if so, it was possibly owing to the irregular manner in which the retorts had been charged during my visit.

The foregoing embrace all the experiments made by me on the clay purified gas of Wakefield upon which I am inclined to place the slightest reliance. It is true that, while awaiting the arrival of my own instruments on the 21st, I made an attempt with one meter (borrowed, I believe, from the county prison, there being none at the gas works), to arrive at an average estimate of the quality of the gas made during two series of observations; but I failed in the attempt, principally in consequence of the rate of deterioration of the quality of the gas not being uniform during the hour or hour and a quarter over which each series extended. Advantage has, however, been most unwarrantably taken of the rough notes made of these experiments to draw inferences from them favourable to the process; and I have only to point out the sources of error in them, to show their utter worthlessness for any such purpose.

My intention was to make, if possible, two or more series of three complete experiments each, the first and third being on the gas at it issued from the first purifier, and the intermediate one upon the gas as it issued from the second purifier—the mean of the first and third experiments being taken as the average of the lime purified gas, and the second as that of the clay purified gas. I adjusted the flame of the burner to the same heighth in all cases, and burnt the gas against a candle for 15 minutes. The first series of three experiments occupied one hour sixteen minutes and a half, including the time occupied in weighing the candle and adjusting the flame; and, while the last experiment was in progress, the foreman informed me that the charges of 28 retorts were exhausted, and their drawing had been suspended upwards of half an hour beyond the regular time. This circumstance, of course, destroyed the value of the whole series; but still the experiments have some interest, as elucidating the effect of the deterioration of the quality of the gas as the charges became exhausted. They may be thus tabulated:—

SERIES A.

| | Consumpt per hour for equal heights of flame. | Value of 5 feet in standard candles. |
|---|---|---|
| No. 1.—First purifier..... | 5·36 feet ..... | 13·91 |
| 2.—Second do. ..... | 5·56 „ ..... | 13·65 |
| 3.—First do. ..... | 6·38 „ ..... | 10·54 |

The time lost between No. 1 and 2 was 16 minutes and 25 seconds, and between No. 2 and 3, 15 minutes and 5 seconds.

About 2½ hours after the termination of the above series of experiments, I commenced a second series, with the hope of being more successful than with the first, the 28 retorts having been in the mean time charged; but, as the foreman accidentally omitted to take the register of the meter at the termination of the first experiment, an oversight which he attempted subsequently to rectify by stating a figure which would have brought the consumpt up to 6·16 feet per hour, while the second experiment was only 5·468 feet, it is clear that the second series was even more liable to objection than the first, and, as my own instruments had in the meantime arrived, I discontinued further experiments in that direction.

In visiting Wakefield I had no intention of making any observations on the purity of the gas beyond the common ones for sulphuretted hydrogen and ammonia, and I therefore was not provided with any instruments or tests whereby the presence of other impurities might be detected. On the day of my arrival, however, seeing that it was a day lost, so far as experiments on illuminating power were concerned, I procured a little alcohol in a shop, and, dissolving in it some caustic potash from Mr. Bowditch's laboratory, I formed a solution of potash in alcohol, through which I slowly passed the two gases for ten or twelve hours, for the purpose of arresting any sulphurous compounds they might contain. My object was not to make a quantitative analysis, and I therefore took no note of the quantity of gas passed through, being, indeed, without the means of doing so. The solution had not been completely evaporated to dryness when I left in the afternoon of the 22nd; but an abundant crop of the well-known yellow needle-shaped crystals of the xanthate of potash had made their appearance on both capsules—the one containing the products of the gas from the first purifier, being covered by an oily fluid which would not evaporate at the temperature of the air. I was quite satisfied from this experiment that sulphur compounds existed in both gases; indeed, Mr. Bowditch admitted that his system did not entirely remove the bisulphuret of carbon, although, according to him, it diminished its quantity. As a further test, I collected a few drops of the liquid produced by burning a jet of the gas from the gasholder, condensing the products in a Liebig condensing tube, and these gave the usual milky tinge with the chloride of barium, faintly, it is true, but quite as distinct as I ever remarked to be given by a gas containing the small trace of ammonia present in the Wakefield gas.

I did not draw up any report of my experiments; but, in the belief that a clergyman of the Church of England was necessarily a gentleman and a man of honour, I gave Mr. Bowditch copies of my notes, including the six experiments which, for the reasons I have given, I deemed worthless; and I expressed my regret that my investigation should have been of so unsatisfactory a character. He promised to carry out my suggestions as to the mode of conducting further experiments, and I quitted Wakefield late in the afternoon of Saturday, April 22. To my great surprise, the post of the following Monday morning brought me a letter from Mr. Bowditch, enclosing for my approval a draft of an advertisement based upon the six first experiments, and omitting all reference to those made on the 22nd, which, he was well aware, were alone those upon which I placed any reliance. I immediately replied in the following terms:—

"*London, April* 24, 1854.

"My dear Sir,—I cannot consent to the experiments I made at the Wakefield gas works last week being published, unless the whole of them are given, with a full explanation by me of the circumstances attending each; but I am decidedly of opinion that you should wait till the means are afforded of a trial such as I last suggested, before any further assertions whatever should be hazarded on the subject. Nothing that I saw during the experiments warrant me in drawing the conclusion that any practical increase in illuminating power was obtained by the process; and I think you will see the propriety of abstaining, for the present, from all allusion to the experiments in documents intended for publication.

"I am, dear Sir, yours truly, THOMAS G. BARLOW.

"The Rev. W. R. Bowditch, Wakefield."

Ten days elapsed without my having received any reply I wrote again to say:—

"I shall be glad to publish in the next JOURNAL any experiments which you have made since I left, on the plan I suggested, as a communicated article, upon the authority of the person making the experiment."

The next post brought me a letter from Mr. Bowditch, inviting me to pay them another visit, and recalling to my notice the six worthless experiments upon which he relied as confirmatory of the experience of Huddersfield, where a gain of 25 per cent. in illuminating power was asserted to have been the result of the introduction of his system. I replied to this by saying—

"I have not worked out the results of my first six experiments, because they are without value (as indicative of the average quality of the gas), in consequence of the rapid deterioration going on at the time the 3rd and 6th were made. The only certain mode is to burn the same gas, purified by each system, one against the other; and I shall be glad to learn that, when so burnt, the gain in the illuminating power is as you state it."

Subsequently he sent me for publication the letter which appeared in the May number of the JOURNAL OF GAS LIGHTING; and, on the 30th of May, having been called by other business into the neighbourhood of Wakefield, I again visited the gas works, with the expectation that measures would have been taken for trying the experiment agreed upon on my previous visit. Nothing whatever had been done with that object; indeed, the whole of the apparatus had been removed; but I tested the gas from the gasholder, and found it to be of 15·1 standard sperm candle power, when consumed at the rate of 5 feet per hour, in the burner used on the previous occasion. Mr. Bowditch at once claimed this as a conclusive proof of the truth of his assertions as to the gain in illuminating power in gas purified by his process, asserting that it was a standard impossible to be reached with the kind of coal there used, save by his system of purification. I denied it, and told him that it was the usual average of the gas from their quality of coal, when distilled and purified by the ordinary processes; and that, if they would refer to my published evidence, given before the parliamentary committees on the Halifax and Burnley gas bills—towns using coal of the same character as Wakefield—he would find that I there stated the Halifax gas to give—

14·5 candles, when consumed in a common Argand.
16·5 „ „ Leslie's „
17·5 „ „ Bynner's „

and at Burnley—

15·0 candles, when consumed in a common Argand.
17·0 „ „ Leslie's „

To this Mr. Bowditch's only reply was, that "he never read long-winded reports." I was, however, struck with the effect produced upon the official "gas tester" by my experiment of April 22 on the illuminating power of the gas, the entries in his own diary *after* that date exhibiting a remarkable falling off from those *preceding* it, the difference being something like 20 per cent., if my memory does not deceive me.

Mr. Bowditch subsequently favoured me with a call in London, bringing with him the draft specification of his patent, upon which I advised him to the best of my humble ability. My last interview with him was, I believe, about the 26th of June, when he solicited an introduction from me to some chemist of eminence, whose report would have weight with gas companies; and, knowing no one, after Mr. L. Thompson, whose experience in the chemistry of gas lighting was equal to that of my late esteemed friend John Thos. Cooper, I gave him a letter to that lamented gentleman; and, from the absence of any testimonial in Mr. Bowditch's behalf, I presume Mr. Cooper agreed with Mr. L. Thompson in his estimate of the value of the process. Dr. Letheby seems to have been consulted about the same period, as a report of his, dated July 7, is appended to the pamphlet entitled, "Gas Poisons and their Remedy;" the remedy recommended being the use of Mr. Bowditch's process, on the ground that the clay, when "drenched with its own bulk of rectified spirit of wine," and the solution treated in a certain manner, yielded, on combustion under a platinum rosette, an abundant precipitate with acid nitrate of baryta, though he will not pledge himself that this arises from bi-sulphuret of carbon. The report would have been more conclusive had Dr. Letheby similarly burnt gas purified by Mr. Bowditch's process, and affirmed that no precipitate was yielded when the products of combustion were similarly treated.

I run some risk of laying myself open to the charge of prolixity, in thus detailing the various phases of my connection with the Rev. W. R. Bowditch and his "clay purification" of gas. I might go into further detail; but I think I have said enough to satisfy my friends that he failed to convert me to his creed in matters of gaseous faith. He is welcome to revel in his delusions without let or hindrance from me. His agents may misrepresent me; and scribes, as contemptible as they are ignorant, may abuse me; but I will not with impunity permit it to be said or suspected, that I have made myself his accomplice in any attempt at imposition on the credulity of the public. THOMAS G. BARLOW.

## Correspondence.

### CLAY PURIFICATION OF GAS.

SIR,—A letter in the JOURNAL OF GAS LIGHTING of yesterday's date informs me that you have had a large number of inquiries relative to the merits of my process for purifying gas by clay; that you have referred these inquiries to Mr. Lewis Thompson, who informs your correspondents that the process is entirely useless—1. As to the removal of any bisulphuret of carbon; and, 2. As to any increase in the illuminating power of gas purified by lime and clay over that purified by lime alone. This letter, therefore, is the official answer of the JOURNAL OF GAS LIGHTING upon the merits of the process. That circumstance is my only reason for noticing it. With Mr. Thompson's experiments, and the conclusions derived from them, I have no concern. He has a perfect right to make experiments for any one who employs him, and to publish them, if he please. But, when he is engaged to answer the correspondents of a public journal, the whole question is altered. In reply, I have to state—1. That clay will, and daily does, remove bisulphuret of carbon from coal gas. 2. That, by the removal of impurities, the illuminating power of gas is increased. I have no intention, however, of letting a great social question, like the purification of gas, rest upon a mere *ipse dixit;* and the only object of this letter is to propose a settlement of the question, which must commend itself to every thoughtful mind. It is this:—Let a committee of three or more of the best chemists in the country—men who command public confidence—be selected, and let them investigate the matter thoroughly, confirming Mr. Thompson's statements or mine, according as they deserve confirmation. Should they ratify his, Mr. Statter and I will pay the whole of the expenses; should they ratify mine, let Mr. Thompson and the Editor of the JOURNAL OF GAS LIGHTING do the same. That no misunderstanding may be possible, the questions for their decision should be—1. Does clay remove from coal gas any impurities which lime will not remove? 2. What are those impurities? 3. Are they injurious to health and property if not removed, but allowed to be consumed with the gas? I leave you to select the judges from any of the following gentlemen:—

| | | |
|---|---|---|
| Professor | Daubenay ..... | Oxford University. |
| „ | Johnstone..... | Durham. |
| „ | Graham ..... | University College, London. |
| „ | Miller ..... | King's College, London. |
| „ | Playfair ..... | Marlborough-house. |
| „ | Hofmann ..... | Royal College of Chemistry. |
| „ | Taylor ..... | Guy's Hospital. |

Any dissatisfaction felt with the decision to be referred to Professor Liebig, Giessen, or to Professor Dumas, Paris, whose determination shall be final.

The only conditions I wish to attach to the proposed investigations are—1. That it be made upon the large scale at a gas works. 2. That the apparatus employed in generating, purifying, and storing the gas be that used in the ordinary manufacture of gas, and none other. (No small-scale experiments could satisfy the public.) 3. That the investigation be made in any gas works in the kingdom, except where Mr. Thompson's experiments have been performed. 4. That the gas be purified strictly according to my directions.

To meet a difficulty which might be started with regard to a place for the investigation, I will obtain permission for it to be made in more than one place, if the matter cannot be accomplished without my intervention.—I am, Sir, your obedient servant,

W. R. BOWDITCH.

*St. Andrew's, Wakefield, Oct.* 11, 1854.

P.S.—Mr. Statter has seen this letter, and entirely concurs in it.

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"*Cucullus non facit monachum.*"—Old Adage.

"A priest may very pious texts repeat,
And yet religion have no inward seat;
'Tis not so clear as the 'old hill of Howth'
A man has got his belly full of meat,
Because he talks with victuals in his mouth."

TOM HOOD.

SIR,—I thank you for sending me a circular containing a copy of the Rev. W. R. Bowditch's very unchristian-like and unbecoming epistle to you upon the clay-purification phantom. That a clergyman of the Established Church of England should be so far imbued with a hungry anxiety after "filthy lucre" as to forget himself and the duties of his office by writing such a letter, is to me a subject of surprise and sincere regret. My acquaintance with this reverend gas-purifier had, indeed, taught me that, whatever divinity might occupy his thoughts on Sunday, the remaining

six days of the week were devotedly given up to the "worship of mammon;" but I did not expect to see so painful an acknowledgment of that fact as is disclosed in the sophistical letter in question. Fortunately for the cause of true religion, individuals of the Bowditch species are very rare in our church establishment; and what Prince Albert happily styled "the money-making parson," is by no means an every-day personage. Indeed, were it otherwise, I scarcely know which would have most reason for lamentation—the people who trusted, or the clergy who betrayed their trust; for of all vices the thirst for gain is that which soonest and most fatally corrupts the heart and perverts the understanding. To the honest mind of a plain Englishman, nothing can be simpler or more to be envied than the position of a faithful minister of the Established Church. His wants provided for by the State, so as to remove him equally from the provocations of poverty and the seductions of wealth; left by his very duties to follow a kind of labour, the due performance of which reacts upon its agent, and, diffusing happiness here, entails an eternity of happiness hereafter; secure in the admiration and respect of his fellow-men, and daily treading in the very footsteps of the Divinity;—what—oh! what might a human being—what might a king! an Emperor!! ask for more than this? Alas! we find that he might desire to be the patentee of a worthless process for purifying gas. Worse still!! that he might so forget himself as to shut his eyes wilfully upon its inutility, and seek to bolster it up by cunning and braggadocia. Worse still!!! that, careless of the sacred duties of his office, he might leave his flock, and go off hunting after "royalties," his mind meanwhile engaged, not in estimating the value of gospel light, but in exaggerating the illuminative power of the light of coal gas. Oh! most melancholy and base conclusion!! Then, with what heartfelt zeal can this man preach to his neglected parishioners on the Sabbath, when all the week long he talks only of coal gas? "They pray to me with their lips, and bow down to me with their knees, but their hearts are far from me." I should be sorry to follow out this theme to its inevitable conclusion, more especially as I am convinced that so mischievous an instance is quite exceptional, and will not soon be made the subject of imitation. We are not accustomed, in this country, to see a clergyman set out with a crosier in one hand and a "hook" in the other, to realise, thus ambo-dexterously, the expression "a fisher of men." Yet I ought not to pass over in silence the reprehensible sophistry contained in Mr. Bowditch's letter; he may, perhaps, think with Ralpho that—

> "If the devil, to serve his turn,
> Can tell the truth, why saints should scorn,
> When it serves theirs, to tell a lie;
> I think there's little reason why—
> Else he has got more power than they,
> Which 'twere impiety to say."

But plain business-men, like gas directors, expect something resembling an adhesion to truth. Now, Mr. Bowditch began by declaring—and he still in his advertisements declares the same—that his clay process purifies coal gas from bisulphuret of carbon, and adds upwards of 22 per cent. to its illuminating power. Well, I tried, in Mr. Bowditch's presence, his process, according to his instructions, and found that it would do neither the one nor the other; that, in fact, like "the pebbles" in the celebrated "flint soup," it was merely "*ad captandum vulgus*," or valuable only in proportion to the ignorance of those who employed it.

And now, with an exhibition of temper fit, perhaps, for a member of the church militant, but certainly not at all becoming in a Christian minister, he challenges me to pay for experiments made with a view to determine—what? that his process *does* remove the bisulphuret of carbon from coal gas, and that it *does* greatly improve the illuminating power? Nothing of the kind, but to determine about as paltry a shuffle as it ever was my luck to meet with. He now proposes to determine—"1. Does clay remove from coal gas any impurieties which lime will not remove? 2. What are those impurities? 3. Are they injurious to health and property if not removed, but allowed to be consumed with the gas?" This "ruse" is too disgusting to bear or require exposure; and as to Mr. Bowditch's presence on the occasion of a trial on "the large scale," I have to tell him that a specification must be so drawn "that a workman or other qualified person shall be able to realise the invention by pursuing the description and course pointed out in the specification," without which it is null and void. His verbal instructions, therefore, if indispensably necessary, vitiate his patent, though this I can assure him would be no loss, as time will prove.

To show how little cause this individual has to complain of my conduct in reference to his process, I will here subjoin a concise narrative of my acquaintance with him and it, from which your readers will see that Mr. Bowditch knows just as well as I do the utter inefficacy of his clay purification, and is deliberately promulgating statements of an illusory kind.

Early in April last I became acquainted with this reverend gentlemen, who wished me to test his process for purifying gas at Wakefield. I, however, preferred to make a few preliminary experiments in London ere I entered on a business which, in spite of my invariable habit of gratuitously giving up my time on such occasions, I foresaw must entail upon the patentee the costs of travelling and hotel expenses.

My first essays were failures, and accordingly, when Mr. Bowditch wrote to me from Wakefield, desiring me to set off at once for that town, I replied that it would be much better and more economical for him to come up to London, and bring with him some of the identical clay which answered the purpose at Wakefield; that the subject was one of very great importance, to which I would most willingly and gratuitously lend the little influence I possessed, if it proved successful, and meanwhile would procure for him in London the necessary facilities for trying his process, together with whatever apparatus he might require on a moderate scale.

Mr. Bowditch accordingly came to town on Friday, April 7, but without any clay, as he said "there was no particular kind requisite—one kind would do as well as another."

The next day (Saturday, April 8) an experiment was made in the presence and with the approval of Mr. Bowditch. A purifier was charged with layers of fire-clay and lime in alternate order, each layer being separated from its neighbours by a stratum of sawdust. The gas was what is called "pure gas;" that is, it had been purified from ammonia and carbonic acid by muriate of lime, and from sulphuretted hydrogen by oxide of iron. The result was emphatically a dead failure—the gas being found as highly charged with bisulphuret of carbon as if no clay had been near it. So decided was the conclusion upon this head, that Mr. Bowditch immediately admitted the fact, and raised an objection to the experiment. He declared that the gas ought to have been impure, and that he had never operated upon pure gas, and did not expect a good result therewith, though he had allowed me to make the trial for his own information. The gas, he said, ought to be in a "nascent state;" by which, after much interrogation, I found he meant that it should be taken from the hydraulic main or condenser at as short a distance as possible from the place of purification. He would not stipulate any particular distance at which the clay began to acquire or ceased to possess the power of purification; but it was at length agreed that ordinary "foul gas" should be operated upon on the Monday following, and a couple of new purifying vessels constructed of a peculiar description specified by Mr. Bowditch himself. These purifiers were to have eight sieves or trays, and to be supplied with foul gas from the same service-pipe. One was to be filled with clay and lime in alternate layers, four of each being employed; the other was to have merely four layers of lime and four empty sieves, so that the two contained exactly the same amount of lime; the only difference being in regard to the clay, which for this experiment was procured at a brickyard in the neighbourhood of the gas works: it was the common surface clay of London. On Monday morning Mr. Bowditch made his appearance, and witnessed the filling of the purifiers without raising a single objection to anything. I charged them with my own hands, and took every precaution to ensure an honest result; for, though I had begun to doubt the efficacy of the process, yet this was less owing to what I had seen than to the shifting and shuffling nature of Mr. Bowditch's explanations. However, all being in readiness and satisfactory, the foul gas was turned on to both purifiers, and regulated so as to pass equally and very slowly through each. On testing the purified gases, not the slightest difference could be discovered between them, either in respect to the bisulphuret of carbon, or to the illuminating power. The experiments were varied in a variety of ways; and, to avoid all risk of unintentional bias either way, I operated upon each without knowing which was which until after the close of the experiments; but there was no difference whatever in regard to the above circumstances. Mr. Bowditch himself seemed even convinced of the fact; and, after partaking, as on the previous occasion, of the hospitality of the worthy superintendent of the works, left, as I thought, with the firm intention of abandoning his worthless scheme. His subsequent conduct admits neither of excuse nor palliation, for he must be well aware of the real truth; and, in fact, his letter clearly proves this, by the altered form in which he now wishes his process to be reported on. In respect to the permission he accords me to publish my "paid"-for reports, he well knows (and no man better by experience) that I do not publish paid-for reports; but, had my gratuitous report of his process been favourable, I am quite certain that he would have published it from one end of the kingdom to the other. So long as there was a hope of this, who so willing as Mr. Bowditch to recognise my authority in such matters? and now, who more impudent in stringing together against me the names of men who would scorn him with contempt?

When any one of the gentlemen he so unceremoniously mentions can be found willing to declare that his clay process purifies coal gas from bisulphuret of carbon, I shall have no difficulty in demonstrating the contrary. Waiting, meanwhile, for so extremely improbable a contingency, I leave this ungrateful divine to the silent punishment of his closet and his conscience. The public may yet hear of him again, for "just as the twig is bent the tree's inclined."

LEWIS THOMPSON.

*London, Oct.* 30, 1854.

## THE "OIL OF VITRIOL" CONTROVERSY.

SIR,—My attention has lately been directed to the subject of gas lighting by a personal friend, who is desirous to have his dwelling-house lighted with gas, but whose wife entertains a great dread of its introduction into the house. Her opinion, hitherto founded upon a popular error as to its unwholesomeness, ultimately became firmly rooted on hearing of Dr. Letheby's state-

ment that, wherever gas is burned in an apartment, the air becomes contaminated with oil of vitriol.

I had seen this statement in the *Times* newspaper, but at the moment paid little attention to it, looking upon it as an incorrectly reported statement of whatever Dr. Letheby might have said in his report to the Commissioners of Sewers; but, to my surprise, on referring to the JOURNAL OF GAS LIGHTING, I found that the *Times* had reported correctly; and that Mr. L. Thompson and others had instituted experiments, some of which I have myself witnessed, to disprove Dr. Letheby's statement. Since then I have repeated some of these experiments myself; and they lead me to the conclusion, that no free sulphuric acid whatever is produced by the combustion of coal gas in the ordinary way as the public burn it, in the state in which it is supplied from the gas works.

My first experiment was made on the 4th of October, in an apartment where both the City of London and Great Central Companies' gases were burnt at the same time, the gas being consumed at the rate of 13 feet per hour. A large glass globe, filled with a freezing mixture, having had its outer surface made perfectly clean, was suspended near the ceiling for several hours, until eight ounces of aqueous fluid were collected by condensation from its surface. The quantity of gas burnt, in proportion to the size of the apartment, was much greater than would be required for the purpose of lighting it up; in fact, although there was perfect ventilation, so as to allow me to remain in the room during the whole time, yet it was uncomfortably hot.

The eight ounces of fluid collected in this way showed a very slight acid reaction to test paper, but became more sensibly acid on evaporation at a steam heat, precisely as a neutral solution of sulphate of ammonia under similar circumstances would do, as every chemist knows. It afforded 1·86 grains of salt, dried at 212°. This salt did not deliquesce on exposure, and afforded, on analysis by means of chloride of platina and a salt of barytes, more than one atom of ammonia to one atom of sulphuric acid: but it obviously contained ammonia united to some organic acid, which Mr. L. Thompson appears to look upon as the formic.

I next collected, in the same way, eight ounces of the hygroscopic moisture of the atmosphere in the laboratory of my friend Mr. Philip Coffey, at Bromley, Middlesex, in which the Commercial Company's gas was burnt in such quantity as to raise the temperature where the globe was suspended up to 100°, the outer air being below 60°. The globe hung immediately beneath a ventilator in the roof, and through which, over the surface of the glass globe, the air of the room must have swept. I shall publish at a future time my examination of this fluid, as it gave a very curious result. Having treated it with chloride of platinum and hydrochloric acid before evaporation, with a view to prevent all loss of ammonia, I then added alcohol to the dry salt, when, to my surprise, it completely dissolved, although it was afterwards found to contain ammonia.

A second quantity of eight ounces of fluid resulting from the combustion of the Commercial gas in the same laboratory, and under similar circumstances, afforded one grain of residual soluble salt, which was nothing more than neutral sulphate of ammonia with some of the organic acid salt.

I am still engaged upon this very interesting subject, and hope, ere long, to be enabled to collect very large quantities of fluid condensed in this way, the analysis of which will, I hope, afford the most decisive results.

I will merely add, in conclusion, that the process of condensation by which the fluid products of gas are thus collected, appears to me quite unexceptionable, and admirably adapted to arrest the free sulphuric acid produced by the combustion of gas, provided any quantity, however small, of that acid be really formed in this way.

*Peckham, Nov.* 8, 1854. MAURICE SCANLAN.

## BOWER'S RETORTS WITH RIDGED BOTTOMS.

SIR,—In the October number of your JOURNAL I find a letter from Mr. George Bower, in which he claims from Mr. Wm. Malam the priority of the invention of retorts "with one, two, or more ribs or ridges rising from the inside of the bottom or floor."

I beg to inform both these gentlemen that, during the last sixteen years, I have constantly used retorts exactly corresponding with this description.

ALFRED KING.

*Liverpool, Nov.* 2, 1854.

## WARNER'S DRY GAS METER.

SIR,—Permit me to inform your readers that "A Gas Fitter's" scheme, as published in your last month's JOURNAL, for "tampering" with dry gas meters, is impracticable with my meter, as manufactured by Mr. Edge. The valve covers of this meter have neither "pitmen," arms, guide-wires, nor studs—the unskilful employment of which has hitherto been the great source of annoyance in dry meters, and so injurious to their reputation as correct measures.

W. J. WARNER.

*Westminster, Oct.* 30, 1854.

# Miscellaneous News.

## CITY OF LONDON COMMISSION OF SEWERS.

GUILDHALL, OCT. 10, 1854.

ALLEGED NUISANCE OF THE CITY GAS WORKS.

Mr. DAW, the chief clerk, said that the following communication had been transmitted to him by the chairman of the West London Union:—

"*Promoter Life Assurance Office, 9, Chatham-place, New Bridge-street, Sept.* 25, 1854.

"Dear Sir,—As I understand it is my neighbour Mr. Holt's intention to direct the attention of the guardians of the West London Union, of which you are chairman, to the terrible nuisance occasioned by the City Gas Works letting their waste water off into the Thames, I deem it only right to apprise you that I have had of late, in consequence of the prominent part I took against the gas works on this subject about two years ago, repeated complaints made to me of this insufferable nuisance, but more especially by the men on Blackfriars Pier, and by the policemen on the bridge. They all represent the stench to be, as I know it is myself, of the most nauseous kind, causing headache and sickness, and as being most injurious to health. The stench is occasioned thus:—every twenty-four hours, just on the turn of the tide at high water, and for about an hour, the gas works let off their waste water, which is highly charged with sulphur and ammonia, into the Thames, and as soon as it comes in contact with the matter emitted from the common sewer, sulphurate hydrogen gas is evolved—one of the most deadly and noxious of gases—and while the chemical operation goes on the stench continues, and only then. This year, however, the nuisance has arisen oftener than for about one hour in the twenty-four, in consequence of there being so little water in the Thames at low water. The water which the gas works let off is of greater specific gravity than common water, and, in consequence, it lodges in the holes and gullies about the bridge and pier, and when the steamboats come at low water they stir the fœtid matter up.

"You are awaie, that at the instigation of several gentleman in Bridge-street, the City of London did indict the City Gas Works, about a year ago, for letting their waste off into the Thames, and that the latter confessed judgment, and can be brought up at any time to receive sentence. I have several times since, and especially within the last few weeks, directed Mr. Gray's attention, the chairman of the company, to the nuisance occasioned by the gas works, and have called on him to abate it forthwith. He has made many promises to do so, but I am sorry to say that hitherto those promises remain unfulfilled. I think it absolutely necessary that the guard ans of the West London Union and the Board of Health should take the matter up forthwith vigorously, and not leave it until the nuisance is entirely abated. "I am, dear sir, yours faithfully,

"J. S. Capel, Esq., Chairman of the West London Union." "M. SAWARD.

Mr. T. H. HALL moved that this letter be referred to the medical officer, with instructions to report thereon.

Referred accordingly.

GUILDHALL, OCT. 31, 1854.

The MEDICAL OFFICER read the following report:—

"Oct. 21.

"Gentlemen,—You have desired me to report on certain complaints referring to nuisances alleged to arise from the City Gas Works.

"I will first mention that two years ago (I believe at the Lord Mayor's desire) legal proceedings were commenced on the part of the Corporation against this same establishment, when I was directed to make inquiry, and procure chemical assistance, with a view to the expected trial. As judgment has not yet been given in these proceedings, which may, therefore, still be considered pending, and liable to be affected by your present consideration of the subject, I thought it desirable that my recent visit to the gas works should be made in company with Mr. T. Taylor, the gentleman already retained as chemical witness in the case.

"What I have now to state on the matter of your reference may be rendered clearer by your considering generally the process of gas manufacture, and observing in which of its stages the liabilities to nuisances arise.

"When coal is heated in the retorts for the preparation of gas there are volatilised from it, together with the materials used for illumination, certain very offensive products. Some of these tend to be deposited from the distilled vapour in proportion as it cools; others require to be withdrawn from it by specific chemical agencies. All gas works present arrangements for effecting in succession these two acts of separation; the first is an apparatus known as the condenser, the second by one called the purifier.

"Within the condenser constant currents of cold water reduce the distilled vapours of coal to a temperature which allows many of their ingredients to revert from a vapourous to a fixed state. An abundance of steam falls as water, rendered fœtid by the sulphurous and ammoniacal ingredients which it has dissolved, while, simultaneously, the volatile oils and resins of the coal reappear as that black compound called tar. There are mechanical arrangements for allowing these impurities to settle in a particular receiver, which of course requires to be periodically emptied. Its very stinking contents are of a commercial value, and the arrangement of the City Gas Company is, on certain days of the week, to discharge this refuse of their establishment into a tank barge, by which it is conveyed beyond your jurisdiction. The loading of this barge always occurs in the daytime, at or about high water.

"The second stage of gas purification is to separate by the action of lime all that has remained in it of sulphuretted hydrogen. In the City Gasworks, where use is made of the apparatus known as the wet-lime purifier, the gas bubbles through great churning-tubs of milk of lime, and leaves in them its sulphuretted hydrogen, combined into sulphuret of calcium. These constitute a very bulky refuse, and, as they are of no commercial value, the company discharges them into the Thames by a pipe which runs from their establishment to near the middle of the river. I am assured by the servants of the company, that this evacuation never takes place otherwise than late at night, and at such periods of tide as may enable the refuse immediately to mingle with large volumes of water.

"Theoretically speaking, this discharge might, perhaps, be inoffensive, for, assuming the action of the condenser to have been complete, and the lime of the purifier to have been in chemical excess, the refuse referred to would consist of an inodorous slush of insoluble proto-sulphuret of calcium, not liable to rapid decomposition in the river water. But this is practically not the case. The blue billy (as it is called) contains many bituminous matters that have escaped precipitation in the condenser, and it is liable

(from deficient action of the purifier) to present free sulphuretted hydrogen, or to contain a soluble and fœtid bisulphuret of calcium instead of the insoluble and inoffensive proto-sulphuret. I, therefore, cannot doubt that its discharge into the Thames must be regarded in the light of a common nuisance which it lies within your functions to suppress.

"To this, however, I must add that, in consequence of the legal proceedings already referred to (judgment meanwhile remaining in abeyance) the gas company has pledged itself to an abatement of the nuisance. In fulfilment of this pledge they have now nearly completed on a very large scale, and at an expense, as they allege, of many thousand pounds, certain new works which will substitute for the second process I have described to you the use of a dry lime purifier; and, by thus giving a castable refuse, will enable them entirely to refrain from polluting the river. As the endeavour to effect this reform is now being made in good faith and at great cost, I presume your honourable court will consider the question of nuisance from the lime purifier, one that may stand over for the present.

"With respect to the other stage of the process—the action of the condenser, I am much disposed to believe that it occasions the more obvious nuisance of the two; and I suspect that the loudest complaints I have heard relate to the period when the tank-barge, moored off the premises of the company, is receiving its freight of tar and ammoniacal liquor, collected from the receivers of the condensing apparatus; for in these ingredients are concentred the well-known odours of gas works—a very complex pungency that may be analysed into something of rotten eggs, something of waterproofing, and something of ill-conditioned urinals.

"I think it would be reasonable to require that this process should be so amended as to occasion no spread of stink in its vicinity; and, without pretending to dictate the terms of any such amendment, I would suggest, as an illustration of what I mean, that the receptacles of this refuse, instead of being fixed in barges, might be moveable vessels capable of being loaded within the building, where the offensive process could be conducted under cover of some hood ventilation into the furnaces of the establishment.

"In addition to those sources of nuisance to which I have adverted, it seems probable that in various acts of shifting and changing the retorts the general atmosphere of the place may be considerably impregnated with the odours complained of. Under existing circumstances it is difficult to judge whether this evil prevails to any serious extent; but if there should continue any complaints referrible to the manufacture of gas when divested of the two principal nuisances now arising in the disposal of its refuse, it may become necessary to revert to this question with a view to require some inodorous ventilation of the building. "JOHN SIMON."

Mr. Ross: I think this a most important question. The report is so comprehensive and minute in all its references to the mode of manufacturing gas, that I think the court can hardly understand it from the mere reading of it. Nevertheless, there are two points which are brought out in strong relief, and which we can consider—the one the preparation of gas in the condensers, the other the ammoniacal products, which appear to be a great nuisance, as these are removed in the tank vessels of the company If the statements contained in the report of the medical officer be correct (and I have not the slightest reason to doubt their accuracy), I think that something ought to be done by the gas company to remedy the evil complained of. Thinking that the company ought to have the report before them for consideration, I move that a copy of it be sent to them forthwith.

Mr. H. L. TAYLOR: I second the motion. I think that much credit is due to the medical officer for the very able report which he has just read, and from which it would appear that he has made himself an entire master of this most important subject. No doubt the company for many years have had their premises in the locality where they now carry on their business, and I dare say that the sweetest and most agreeable smells are not produced by the manufacture of gas. (Hear, hear.) At all events, the company have proved themselves exceedingly desirous to do all that can be expected of them, according to the medical officer's report.

The motion was put and carried unanimously.

## PRESENTATION OF TESTIMONIAL TO LEWIS THOMPSON, ESQ., M.R.C.S.

On Wednesday evening, the 1st inst., an assembly of gentlemen, professionally connected with the manufacture of gas in the metropolis and the provinces, took place at the York Hotel, Bridge-street, Blackfriars, on the occasion of presenting Lewis Thompson, Esq., M.R.C.S., a suitable testimonial, in acknowledgment of his indefatigable researches and ingenious investigations into the nature and properties of coal, and the processes used for its distillation.

GEORGE LOWE, Esq., the engineer of the Chartered Gas Company, presided on the occasion, and was supported on the right by Mr. Lewis Thompson, and on the left by William Hawes, Esq., the son of the respected and venerable chairman of the Chartered Company. Amongst the other gentlemen assembled we observed D. Sprague, Esq.; J. Kirkham, Esq.; J. Evans, Esq.; Alexander Ure, Esq., surgeon to St. Mary's Hospital; W. Billett, Esq., chairman of the Tottenham and Edmonton Gas Company; Mr. Laing, of the Independent Gas Company; Mr. Alexander Wright; Mr. Kirkham, junior; Mr. Goddard, of Ipswich; Mr. Sharp, of Southampton; Mr. Dixon, of Chichester; Mr. Macpherson and Mr. Stark, of Woolwich—in all, fifty-five gentlemen connected with the gas interest of the metropolis and provinces sat down to an excellent dinner. The cloth being removed,

The CHAIRMAN proposed the health of her Majesty the Queen, the health of his Royal Highness Prince Albert, and the rest of the Royal family, which were responded to with the greatest enthusiasm.

The next toast was "The Army and Navy," and in proposing it the chairman said he felt deep emotion at such a moment in proposing this toast to a meeting of Englishmen. He was sure they all felt a deep sympathy for those brave fellows who were using their sinew and their muscle in defence of their country. In this great and glorious struggle they were being nobly aided by our neighbours the French, and he had no doubt but that they would aid with all their might this great struggle for justice and civilisation. He would give them, "God bless the Army and Navy." (Loud cheers.)

The toast was drunk amidst great applause, which was renewed by the company on the introduction, at this stage of the proceedings, of the magnificent specimen of art intended for presentation as a testimonial to Mr. Lewis Thompson. It was carried by the honorary secretary (Mr. Wright), and a member of the committee, and deposited on the table in front of the chairman, amidst the loud plaudits of the assembly.

The testimonial consisted of an exquisitely designed épergne, manufactured by Messrs. Garrard and Co., of Penton-street, St. James's, two feet in height, weighing upwards of 180 ounces, and of the value of £200. The base consisted of a well-designed stand, ornamented with projecting vine leaves supporting an elegant pedestal, and three allegorical figures, brought out in frosted silver, appropriate to the conduct and character of the gentleman intended to honour. The principal figure in the foreground represents an aged philosopher, in the act of repelling, by a motion of his right hand, the attempt of Plutus, the mythological god of wealth, to bribe hm with money which he has in his hand tendering to the philosopher. On the left, immediately at his feet, are the utensils and emblems of alchemy and chemistry; whilst immediately over him, on the left, is a delicately executed figure of Fame, with her trumpet in one hand, and a wreath in the act of crowning the philosopher. The summit or cap of the pillar, which is of fluted silver, consists of overspreading and bending leaves and flowers, from the centre of which springs a light and elegant basket for holding either fruit or flowers. The whole work, which reflects the greatest credit upon those who designed it, bears on the front of the stand, neatly engraved, the following inscription:—

"Presented to Lewis Thompson Esq., M.R.C.S., in acknowledgment of his indefatigable and ingenious investigations into the nature and properties of coal, and the processes used in its distillation, and his disinterestedness in imparting information upon the true principles on which the manufacture of gas should be conducted, by one hundred and ten gentlemen professionally engaged in connection with gas works 1st Nov. 1854."

The Chairman said—"My friends, we have now arrived at the toast of the evening; or, rather, at the important business of the evening; and be assured that I should tremble not a little in grappling with such a subject, and in performing the duty assigned to me as your chairman, if I did not know the character and the temperament of the gentleman who sits upon my right hand, and whom we all so well know as the "Man of Pancras-lane." (Cheers and laughter.) I know right well that our friend, Mr. Lewis Thompson, would be thoroughly distressed at any attempt of mine at any overstrained efforts of panegyric and praise on my part, however well it may be, as I know is, deserved. (Hear, hear.) I know that this our friend must feel delighted in finding so many friends and fellow-workers in the same field here to meet him upon such an occasion; and I know that you will agree with me, that our friend has the grateful feeling and kind expression of every heart around this table. (Cheers.) A chairman without a speech is a nonentity. On this occasion, however, I am in the happy position of being favoured with materials for two speeches. In presenting to our excellent friend, Mr. Lewis Thompson, this beautiful tribute to scientific worth now before me, I must say, it doth "its own tale unfold." Here is Fame, with her trumpet, holding that wreath over the head of the representative of our friend, the philosopher, in the foreground, with his alembics by his side, and engaged in the study of that science from which we all have derived so great a benefit. Whilst our friend the philosopher is thus engaged, we have here on the right an ancient genius attempting to bribe the philosopher. Our friend turns his back upon this Plutonic gentleman, and shows that he is rather entitled to that praise which Fame has been sounding by means of her trumpet, than to be led away by that dross which can only be found to have its effect upon minor minds and sordid intellects. Our friend the philosopher, therefore, turns his back upon the Plutonic gentleman, and takes the higher views so commendable to the human species. I said that I had a second speech. Though this second speech does not relate to metal or bullion, but to that which I calculate will be not the less acceptable and esteemed by our friend whom we have met here this night to honour—I allude to the numerous letters of our subscribers, all breathing the highest admiration of the long-sustained and skilful and useful development of the mind of our friend, tending so much to aid and to secure improvement in gas lighting. (Hear, hear.) They all contain, I assure you, expressions of the warmest esteem and gratitude for the man who has done so much for the cause in which we are all engaged. (Hear, hear.) I am sure our friend must feel delight in the unanimity of that expression; and when I state that this elegant work of art before me has been raised by the subscriptions of 110 individuals, who have had an opportunity of judging of the merits of our friend Mr. Thompson, I think I need not say more than that such a testimonial is likely to outlive the period of a petty day, which is that of a man's existence. My feelings will not allow me to add much more. I have made the two speeches I promised, but I wish to say a word or two to our friend on my right, on the occasion of our presentation to him, of this noble evidence of his worth. I say to him—My friend, our friend—you are beloved, you are esteemed. Your fellow-men have assembled here to do honour to you. They do not know which to admire most, your kindness of heart, or the exercise of your extraordinary and transcendent talent; and the utter contempt with which, in the exercise of that talent, you have treated advances such as have been made by this Plutonic gentleman represented on this pedestal. (Hear.) I have had the honour to know you many years; and, when you and I were schoolboys, I know that you had the same high-minded feelings which have distinguished your character in riper years; the same public spirit; and, in presenting to you this humble testimonial of your worth and integrity, permit me to say "God bless you!" (Loud cheers.)

The Chairman then read the inscription on the plate amidst great applause, and presented the testimonial to Mr. Thompson, and his health was drunk amidst great enthusiasm.

Mr. Thompson rose, under deep feelings of emotion, to respond to the toast. He said—Gentlemen, I can hardly find words to express the state of my feelings at the very great kindness which you have shown to me. I regret that, whatever other attainments I may happen to possess, I am deficient in eloquence adequately to respond to the honour you have been pleased to confer upon me; suffice it to say that my heart feels deeply grateful. I do not mean to say that our excellent chairman did not feel everything he has said, but I fear that Mr. Lowe, in his kindness to me, has much overrated me. (No, no.) In the beginning of my career, in reference to gas matters, I was at the outset looked upon with suspicion and doubt. It was quite natural and proper that I should be so regarded. It was by good luck, I believe, and by my good fortune, that I happened to enlist the sympathies of the managers of gas works in my favour; and, in speaking of the managers of our gas works generally, I may speak of them as a class of men who would do honour to any section of society in the world. It has been my province to collect the information, to collect the talent of those gentlemen together, and to act as a sort of filterer, by which means the gas atmosphere has been clarified, and has been passed in a purer state to the public. I have been assisted ably in my researches, and if I have produced anything which may have proved valuable, either to the gas community or the public, I am much gratified; at all events, I am sure you will take the will for the deed. (Hear, hear.) I regret that I am not competent to address you so ably or eloquently as I would; but permit me, gentlemen, in conclusion, again to thank you, and to drink all your healths. (Cheers.) Gentlemen I will now, with your permission, ask you to join me in a toast which I feel will afford us all the highest satisfaction, because it is the health of one who has been long connected with gas lighting—I beg to propose the health of our chairman, Mr. George Lowe. (Loud cheers, amidst which the toast was responded to.)

The Chairman: Our friend has stated that which is perfectly true, namely, that I have served and seen many years in connection with gas lighting. I have served under one master for 33 years; and it delights me to find that I have here friends, who have with me, borne the brunt of the day. Like him, I have endeavoured to discharge my duty; and it is with no small degree of pride and satisfaction that I refer to the fact that I am supported upon this occasion by the son of the venerable and respected chairman of the Chartered Gas Company, with which, as you are aware, I have so long been connected. I am delighted to find that the excellent son of that most excellent gentleman who sits on my left hand, and who is here to do honour to our friend Mr. Thompson upon this most interesting occasion. We have had many a up-hill fight in the cause of gas lighting, and the Chartered Gas Company has had much to do in combatting with the enemy, and in battering down the walls of prejudice. We had to fight against great influence, but I am happy to say that we have overcome every difficulty. When gas lighting was first introduced, people would complain, "Oh, what a bubble concern that gas lighting is!" but there were some few of us who stood in the gap and broke down prejudice. (Hear, hear.) We had charges made against us even in the Legislature, and there were such things as 6-candle gas and 1-candle gas spoken of. (Laughter.) What was still more vexatious to me—and I believe it would be so to every right-minded man—was, that such statements, such absurdities were made upon oath—(hear)—yet such was the fact. I again say, after 33 years' service, in which I have seen great vicissitudes in reference to gas matters, I am exceedingly happy to be here to do honour to my friend Thompson; and I thank you for the way in which you have been pleased to receive the toast of my health. (Cheers.)

Mr. Vice-Chairman Laing said, he had to ask the permission of the chairman to propose a toast. (Cheers.) Much as they all admired the transcendent talents of their friend Mr. Thompson, great as his services had been to the gas interest, still, without the means of communicating Mr. Thompson's talented papers to the public, they would have been comparatively of little effect. (Hear, hear.) The toast he was about to propose was the health of a gentleman who had been mainly instrumental in giving to the world the development of the valuable researches of their friend Mr. Thompson, at great trouble and expense, in a journal devoted to gas interests. (Hear.) He alluded to their friend Mr. Barlow. (Cheers.) He gave them the health of Mr. Barlow; success to the undertaking he has in hand; and prosperity to the "Journal of Gas Lighting." (Loud applause, amidst which the toast was drunk.)

Mr. Barlow said, he was much obliged to the gentlemen for the way in which they had drunk his health, and for the kind expresions in favour of the journal under his controul. He felt proud in having the opportunity of conveying to the world, and the gas interest in particular, the valuable effusions of their friend Mr. Thompson, which had been productive of so many advantages. In the conduct of his journal he had endeavoured to deal with all gas matters in a liberal spirit, and to hold the balance equal as far as possible between the rival systems and interests; the principles which guided him being the obtaining for the public an ample supply of pure gas at the lowest price consistent with the payment of a fair interest on the capital invested in gas undertakings. (Hear, hear.) He felt deeply grateful for the compliment which had been paid to him. (Hear, hear.)

The Chairman said, he had been lately in the French metropolis, and had had the pleasure of being accompanied by M. Danré, who had recently lighted Stockholm. That gentlemen had expressed his regret that he was unable to be there on that occasion to take wine with them, but still his heart was with them. (Hear.) He believed he was correct in stating that M. Danré was engaged in lighting Calcutta, and he hoped that he would overcome prejudice there, as the Chartered Company had ultimately overcome it here. When the Chartered Company started, there was a Davy in existence, and talented though he was, yet he even was affected with prejudice against gas lighting. This was in the days of George III., and when the Chartered Company applied to the Privy Council for the charter, Davy made use of the expression, "What do these wiseacres want with a charter?" He repeated these prejudiced observations in his lectures at the Royal Institution at the very time that he was addressing his auditory from a light manufactured from coals, under the guidance of a now celebrated professor, who was at that time, he (the chairman) believed, called plain Michael Faraday. He mentioned this to show that even a great and enlightened mind like "Davy" was prejudiced against gas lighting. Gas lighting had now so progressed that it was contemplated even to light Valparaiso. The price might be rather stiff—25s. per 1000 feet—(laughter)—but that was a matter which in time would rectify itself. (Hear.) Although they had not the presence of M. Danré, still he was sure they all wished him success, and, coupling with that gentleman's name, he begged to propose "Prosperity to gas lighting all over the world." (The toast was drunk amidst loud applause.)

Mr. Laing wished to trespass upon the company to propose another toast. (Hear.) The toast he was about to propose was the "Health of the directors of the metropolitan gas companies." (Cheers.) He was one of those who thought there ought to be a better feeling than there was between the London gas companies. (Hear, hear.) They were honoured by the presence of the son of the chairman of the oldest gas company in London. He believed there was also a director of the London Gas Company, and a member of the board of the South Metropolitan Company. They had Mr. Hawes as the representative of the Chartered Company, and Mr. Sprague as representative of the

London Company. He would propose "The Directors of the London gas companies." (Applause.)

Mr. SPRAGUE returned thanks. He cordially agreed with the sentiment which had dropped from the gentleman who had proposed this toast, namely, that there should be a better feeling existing between the London gas companies. He was perfectly convinced that by the present system not only were the interests of the various companies themselves damaged, but the interests of the public also. (Cheers, and loud cries for Mr. Hawes.)

Mr. HAWES said, thus called upon, he begged to respond on behalf of his father, who, although 85 years of age, was still the actice governor of the Chartered Company. Some allusion had been made to the prediction of Sir Humphrey Davy, that gas lighting would be a failure. He almost regretted that the great and only blunder of that great man had been adverted to by their excellent chairman. It was a matter too often referred to in society, while the services rendered to science by that distinguished chemist were passed over in silence. It was the never-failing argument in support of every new chimera; and, whether it may be the table turner, the homœpathist, or the mesmerist, all appeal to Davy's condemnation of gas lighting as an instance of the little reliance to be placed on scientific men. My experience, said the speaker, is, that this is the exception rather than the rule; for our friend here, whom you have met this evening to honour, and whom I have known for many years, probably longer than any of the gentlemen present, I can say that his career has been one long career of laborious investigation, having always some great practical end in view. I have been engaged with him in many matters, and have been for a considerable period his employer; and I can bear my testimony not only to his great aspirations for the improvement of the manufactures of our country, but I may safely assert that in chemical knowledge he is second to no man in this country. Chemistry is a science which, to be prosecuted with success, requires the whole of the senses as well as the reflective powers to be in the highest state of perfection. Delicacy of touch, a refined sense of smell, and almost microscopic powers of vision, are as necessary as extraordinary powers of analytical reasoning, to constitute a great chemist. All these qualities our friend possesses in an eminent deeree. (Enthusiastic cheers.) He has, however, one great fault, and that is his utter neglect of selling his talents at their market value. I have often remonstrated with him upon this defect in his character, and I hope he will mend. (Laughter.) You who have rewarded his labours in the improvement of the manufacture of gas, have shewn an honourable appreciation of his talents, and have happily caught that remarkable feature of his character by the allegorical representation on the elegant work of art now before us. I hope, however, for the future, he will look somewhat more kindly upon the figure on his left, Plutus, for a certain amount of the gifts of that mythological deity are not to be altogether despised. Mr. Hawes concluded by thanking the company for the manner in which his name had been associated with the toast, and sat down amidst the most enthusiastic applause.

Mr. LAING was again about to be troublesome, but he had a toast which he thought out not to be omitted. It was a well known fact that most of the improvements in gas science had been produced from the provinces. (Hear.) That was mainly attributable to the greater amount of time the provincial gas engineers had upon their hands for experiments; but nevertheless such was the fact, and he had great pleasure in proposing the health of their friend "Mr Goddard and the managers of the provincial gas companies." (Cheers.)

Mr. GODDARD, of Ipswich, responded, and said that the provincial gas managers were mainly indebted to the JOURNAL OF GAS LIGHTING for the improvements they had been able to effect. (Hear, hear.) There was one toast which he thought ought not to be forgotten, and that was the health of Mr. Wright, the hon. secretary to the Testimonial Committee. (Loud applause, amidst which the toast was responded to.)

Mr. WRIGHT responded, and spoke of the advantages he had derived from the tuition of their excellent friend Mr. Thompson, with whom his relations had not been of the character usually existing between master and scholar—large pay and little information; in his case, the circumstances were reversed, as he had received a vast amount of information gratuitously; and, in return, he advised his friend to make more of his next pupil.

This concluded the proceedings of a most delightful and intellectual evening's entertainment.

THE FOLLOWING IS A CORRECT LIST OF THE SUBSCRIBERS TO

## THE THOMPSON TESTIMONIAL.

CHAIRMAN.

GEORGE LOWE, Esq., F.R.S., 39, Finsbury Circus, London.

HONORARY SECRETARY.

ALEXANDER WRIGHT, Esq., Western Gas Works.

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| G. Bower, Esq. | Gas Works | St. Neots. | R. Jones, Esq. | Commercial Gas Works | London. |
| S. Bartlett, Esq. | " " | Maidstone. | H. Jones, Esq. | Gas Works | Eton. |
| E. Breillatt, Esq. | " " | Bristol. | G. Joslin, Esq. | " " | Colchester. |
| J. Breillatt, Esq. | " " | " | T. N. Kirkham, Esq. | Imperial Gas Works | Fulham. |
| O. Brothers, Esq. | " " | Blackburn. | A. Keith, Esq. | Gas Works | Kilkenny. |
| M. Broadhead, Esq. | " " | Great Grimsby. | J. Lyon, Esq. | " " | Ormskirk. |
| J. Braddock, Esq. | " " | York. | J. S. Lade, Esq. | " " | Gloucester. |
| H. Bowen, Esq. | " " | Cardiff. | J. Mudie, Esq. | " " | Bilston. |
| J. Carr, Esq. | " " | Cheltenham. | H. Macpherson, Esq. | Equitable Gas Works | Woolwich. |
| S. Church, Esq. | City of London Gas Works | London. | G. Marshall, Esq. | Gas Works | Wisbeach. |
| W. H. Chambers, Esq. | Gas Works | Beccles. | J. Malam, Esq. | " " | King's Lynn. |
| J. Cooper, Esq. | " " | Hunmanby. | T. H. Nimmo, Esq. | " " | Reading. |
| G. Childs, Esq. | " " | Southwold. | S. Neil, Esq. | " " | Lisburn. |
| J. Crosthwaite, Esq. | " " | Carlisle. | W. Phillips, Esq. | " " | Luton. |
| S. Church, Esq. | City of London Gas Works | | T. Pridmore, Esq. | " " | Hinckley. |
| Jos. Cowen, Esq. | Gas Works | Blaydon. | L. W. Pritchard, Esq., | Western Gas Works | London. |
| Thos. Crump, Esq. | " " | Derby. | H. M. Robinson, Esq., | Gas Works | Leicester. |
| W. Callow, Esq. | " " | Birkenhead. | J. W. Robinson, Esq. | " " | Leamington. |
| P. Cowan, Esq. | Oriental Gas Company | | R. Roberts, Esq. | " " | Oswestry. |
| C. Dixon, Esq. | Gas Works | Chichester. | J. Russell, Esq. | " " | Dundee. |
| N. Defries, Esq. | Regent Street | London. | T. Rofe, Esq. | " " | Preston. |
| J. Dunning, Esq. | Gas Works | Middlesboro'. | W. C. Raper, Esq. | " " | Leeds. |
| J. Dewsbury, Esq. | " " | Rochester. | C. Smith, Esq. | " " | Warrington. |
| S. Darwen, Esq. | " " | Stockport. | R. P. Spice, Esq. | " " | Richmond. |
| G. W. Drory, Esq. | " " | Ghent. | Alex. Starke, Esq. | Consumers' Gas Works | Woolwich. |
| Jules Danré, Esq. | Oriental Gas Company | | F. Sanders, Esq. | Hibernian " | Dublin. |
| John Evans, Esq. | | London. | J. C. Sowman, Esq. | Gas Works | Bury St. Edmunds. |
| W. Esson, Esq. | Gas Works | Cheltenham. | S. R. Scoltock, Esq. | " " | Stoke-upon-Trent. |
| T. Egan, Esq. | " " | Tralee. | F. Sonntag, Esq. | " " | Mayence. |
| H. Everist, Esq. | " " | Kidderminster. | Thos. Sharp, Esq. | Prince's Villa | Leamington. |
| J. Etchells, Esq. | " " | Ashton. | J. Stelfox, Esq. | Gas Works | Belfast. |
| W. Fiddes, Esq. | " " | Bristol. | J. Shedlock, Esq. | " " | London. |
| — Foxall, Esq. | " " | Beverley. | D. Swallow, Esq. | " " | Bradford. |
| H. Good, Esq. | " " | Canterbury. | Isaac Shier, Esq. | " " | Marlborough. |
| J. Gill, Esq. | " " | Ratcliff. | H. H. Townsend | " " | Bristol. |
| A. Grounds, Esq. | " " | Ludlow. | E. Unwin, Esq. | " " | Sheffield. |
| W. Green, Esq. | " " | Dartford. | E. Vautier, Esq. | | Lyons. |
| W. Ginner, Esq. | " " | Hastings. | F. Warren, Esq. | " " | Plymouth. |
| J. Gibb, Esq. | " " | Armagh. | E. Waite, Esq. | " " | Bristol. |
| S. Haynes, Esq. | " " | Lichfield. | J. Walpole, Esq. | " " | Waterford. |

The testimonial may be inspected at Messrs. GARRARDS for the next ten days.

## HALF-YEARLY MEETING OF THE CHARTERED GAS COMPANY.

The half-yearly meeting of this company was held at the offices of the company, Horseferry-road, Westminster, on Friday, the 3rd inst.. The chair was taken by BENJAMIN HAWES, Esq., the governor, and the attendance of proprietors was numerous.

The proceedings of the previous general meeting having been read by the secretary, and confirmed, the following report was read:—

"The accounts of the half-year's transactions of this company, which it is our present duty to place before you (already submitted to such of the proprietors as desired to investigate them prior to this meeting), show a less balance of profit than your directors desired and anticipated; still, however, they recommend to you a dividend at the rate of £4 per centum per annum (which they will be enabled to do, by suspending the writing off of any sum from new works account for the present half-year), to be paid in the usual manner, and freed from income tax.

"Although your board of directors had secured an abundant supply of coals for consumption during the winter months, the frost, which set in with such suddenness and severity, prevented the landing of upwards of twenty cargoes, a condition of things which, coupled with the strikes of pitmen, and great rise in freightage through the extraordinary demand for coals for the continent, occasioned an increase in that item, as compared with the corresponding period of the year 1853, of no less than £19,000; while, on the other hand, the sale of products and increase of rental have realised nearly £14,000 more than before.

"Still this circumstance (against which no foresight could provide) operates most unfavourably upon these accounts. It is an alleviation, however, to remark that, owing to the improvements in your concern, which have been made from time to time, and are now progressing, a great decrease in the expenditure has been effected already; and it is probable that, in the item of wear and tear, the future charge will be still more considerably reduced.

"The account of new works shows an increase of £4500: an outlay, which has been enforced upon this as the oldest gas company to a greater extent than others, and incurred for the adoption of such enlargement and improvements in the establishment, as your court of directors believe will command the acknowledgment, that it is not only first in the order of time, but in every sufficiency for the public service."

The GOVERNOR said: Although the accounts for the past half-year do not show that increase we had been led to anticipate—in fact, the profit is not enough to pay the dividend without trespassing on the reserve-fund—still I am of opinion the affairs of the company are nevertheless in an improving condition. The difficulties the directors have had to contend with during the past half-year have been of an extraordinary character, caused by the late severe frost, the strikes of pitmen, and the difficulty of getting ships. This has entailed a very large additional expenditure, and is the cause of the low profit already alluded to. Although every precaution was taken to ensure a proper supply of coal, we have been compelled to buy in the market at a very high rate; and at one time we had not less than 20 cargoes of coals in the river, but could not get one in course of delivery. The large outlay that has taken place in the erection of new works, is now beginning to bring in a return; and I have no doubt but that a saving of at least £5000 per annum will be effected in retorts alone. The examination and repair of about 80 miles of main, within the last three years, have had the effect of preventing a large amount of leakage of gas, although the expense has necessarily been great. All these things taken together will, I have no doubt, raise the value of the concern, and make it more profitable than it has of late been; and I fully anticipated an increase to the dividend. So satisfied am I of this, that I have invested, and still am investing, largely in the concern; and I believe I am now one of the largest shareholders. I do not mention this as at all boasting, but merely to show the value I attach to, and the confidence I have in, the concern. I am happy to say, all the alterations and additions that have been made have been attended with marked success, and have fully borne out the expectations formed of them by the directors. I am also happy to inform you, that we have been called upon to supply the Queen's ball-room at Buckingham Palace with cannel gas, the main for that purpose having been previously laid, in anticipation of such an application being made. We have also been called upon for a supply of cannel gas to the House of Commons. Mr. Barry, the talented architect, requested to be informed how soon a supply could be given. We replied, in 48 hours; and, the quality having been deemed so satisfactory, we have since been called upon to supply the House of Lords. The company's property is now entirely freehold; and, instead of having to pay any rent, we receive £573 per annum. We pay ready money for everything, and have no bills payable, as I see some other gas companies have. The rental for lights is gradually increasing: in 1851 it was £134,427; in 1852, £134,915; and in 1853, £149,421. —The worthy governor then sat down; and the meeting were evidently pleased with his address, which told remarkably well on many important points.

Mr. GEISLER said, he had been often told the same tale; but, as he found we got from bad to worse, he had no confidence, and should therefore move that the attendance of the directors be limited to two per week, with a fee of one guinea for each attendance.

Mr. BOX explained, that the bye-laws of the company would not allow of this alteration, which could only be done by an alteration of the bye-laws themselves.

Mr. BECK (deputy-governor) said, the bye-laws were made by the shareholders, and could not be altered without their sanction, and after proper notice had been given; and he read to the meeting the laws themselves relating to the subject. He was of opinion that the directors were underpaid, considering the large amount of time they bestowed on the affairs of the company, which was rendered necessary by the great amount of work there was to be done.

Mr. GEISLER said, he would give the necessary notice to that effect. The opinion of the meeting seemed, however to be against him.

### CAPITAL ACCOUNT, JUNE 24, 1854.

| *Dr.* | | | | | | *Cr.* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| To amount of 1st. 2nd, and 3rd capitals, after deducting the amount of 1419 shares, in the 1st, 2nd, and 3rd capitals, cancelled | | £529,050 | 0 | 0 | | By amount due to the company, viz.: | | | | | |
| To amount of 4th capital, after deducting the amount of 836 shares cancelled.. | | 51,640 | 0 | 0 | | For rent of light at the several stations, viz.: | | | | | |
| | | 580,690 | 0 | 0 | | At Westminster station | £28,804 | 14 | 1 | | |
| Expended, viz.:— | | | | | | At Brick-lane „ | 17,030 | 16 | 0 | | |
| Westminster station. | £314,351 | 10 | 10 | | | At Curtain-road „ | 7,047 | 13 | 5 | | |
| Brick-lane „ | 144,912 | 19 | 11 | | | | | | | £ 52,883 | 3 6 |
| Curtain-road „ | 62,298 | 15 | 10 | | | For coke and breeze sold at the stations, viz.:— | | | | | |
| | | 521,563 | 6 | 7 | | At Westminster station | 970 | 19 | 8 | | |
| | | | | | 59,126 13 5 | At Brick-lane „ | 861 | 6 | 3 | | |
| To amount of dividends remaining unpaid | | | | | 5,974 8 6 | At Curtain-road „ | 161 | 8 | 7 | | |
| To amount of debts due by the company, for coals, and to sundry tradesmen and others | | | | | 7,678 7 11 | | | | | 1,993 | 14 6 |
| To amount due to collectors for commission, viz.: | | | | | | For ammoniacal liquor sold at the stations | | | | 51 | 17 7 |
| At Westminster station | | 317 | 10 | 8 | | For tar sold at the stations | | | | 862 | 16 6 |
| At Brick-lane „ | | 188 | 0 | 5 | | By amount of the balances of sundry accounts due to the company | | | | 2,152 | 12 9 |
| At Curtain-road „ | | 64 | 6 | 7 | | By treasurer's account, viz.:— | | | | | |
| | | | | | 569 17 8 | Balance of general acct. | £4410 | 8 | 9 | | |
| To amount due for wages and contingencies, viz.:— | | | | | | „ dividend acct. | 299 | 16 | 0 | | |
| At Westminster station | | 458 | 6 | 0 | | | | | | 4,710 | 4 9 |
| At Brick-lane „ | | 297 | 14 | 4 | | By bills on hand not paid | | | | 18 | 14 10 |
| At Curtain-road „ | | 104 | 8 | 4 | | By cash advanced to pay wages at the stations | | | | 980 | 0 0 |
| | | | | | 860 8 8 | By stores on hand, viz.:— | | | | | |
| To amount due at the chief office for contingencies | | | | | 3 10 6 | At Westminster station | 5,485 | 9 | 10 | | |
| To balance of profit and loss, viz.:— | | | | | | At Brick-lane „ | 4,519 | 1 | 4 | | |
| Balance to Dec. 25, 1853. | 12,429 | 3 | 5 | | | | | | | 10,004 | 11 2 |
| Less half-year's dividend on £580,690 | 11,613 | 16 | 0 | | | By coals on hand, viz.:— | | | | | |
| | | 815 | 7 | 5 | | At Westminster station | 7,750 | 16 | 8 | | |
| Profit of the half-year ending June 24,'54 | | 8,489 | 2 | 7 | | At Brick-lane „ | 3,112 | 8 | 2 | | |
| | | | | | 9,304 10 0 | At Curtain-road „ | 1,049 | 10 | 9 | | |
| To the contingent fund | | | | | 23,375 0 0 | On ship-board | 280 | 0 | 4 | | |
| | | | | | | | | | | 12,192 | 15 11 |
| | | | | | | By coke and breeze on hand, viz.:— | | | | | |
| | | | | | | At Westminster station | 76 | 17 | 9 | | |
| | | | | | | At Brick-lane „ | 47 | 12 | 0 | | |
| | | | | | | At Curtain-road „ | 24 | 17 | 0 | | |
| | | | | | | | | | | 149 | 6 9 |
| | | | | | | By ammonical liquor | | | | 43 | 0 4 |
| | | | | | | By ship despatch | | | | 875 | 11 10 |
| | | | | | | By balance of amount expended for new works at Christmas, 1853 | 15,404 | 15 | 0 | | |
| | | | | | | Expended during the half-year to Midsummer | 7,334 | 11 | 3 | | |
| | | | | | | | 22,739 | 6 | 3 | | |
| | | | | | | Less amount written off profit and loss account | 2,765 | 0 | 0 | | |
| | | | | | | | | | | 19,974 | 6 3 |
| The contingent fund:— | | | | | | | | | | | |
| All the shares having been cancelled, the fund now consists of the above balance | | £23,375 | 0 | 0 | | | | | | | |
| And 3¼ per Cent. Annuities | | 21,419 | 13 | 10 | | | | | | | |
| | | | | | £106,892 16 8 | | | | | £106,892 | 16 8 |

*Dr.* PROFIT AND LOSS ACCOUNT, FROM DEC. 25, 1853, TO JUNE 24, 1854. *Cr.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| To coals consumed in the half-year | | | | £ 56,237 | 5 | 9 | By rental of light for the half-year | £ 78,687 | 8 | 10 |
| To stores, &c., used in the half-year, viz. :— | | | | | | | By coke and breeze „ viz. :— | | | |
| Retorts | £3,337 | 10 | 6 | | | | Coke | £22,413 | 13 | 9 |
| Lamps | 274 | 11 | 11 | | | | Breeze | 1,202 | 5 | 9 |
| | | | | 3,612 | 2 | 5 | | | | |
| General wear and tear, mains, and carrying on the works | 9,016 | 4 | 10 | | | | | 23,615 | 19 | 6 |
| Less received for old and burnt stores | 1,275 | 5 | 4 | | | | By ammoniacal liquor for the half-year | 115 | 6 | 8 |
| | | | | 7,740 | 19 | 6 | By tar „ | 1,747 | 8 | 7 |
| To meters | | | | 1,980 | 3 | 10 | By naphtha „ | 283 | 10 | 0 |
| To paving | | | | 1,231 | 7 | 1 | By discounts and abatements allowed by tradesmen | 1,955 | 17 | 0 |
| To directors and auditors | | | | 1,342 | 19 | 0 | By Poplar station rent account, balance | 12 | 2 | 9 |
| To salaries and commissions | | | | 4,216 | 17 | 8 | By rents received | 283 | 16 | 9 |
| To wages and contingencies | | | | 15,582 | 3 | 11 | By dividend on the contingent fund, viz., on £21,419. 13s. 10d. in 3¼ per Cent. Annuities | 337 | 18 | 4 |
| To rent and taxes, viz. :— | | | | | | | | | | |
| Rent | 134 | 4 | 6 | | | | | | | |
| Taxes | 1,099 | 3 | 1 | | | | | | | |
| | | | | 1,233 | 7 | 7 | | | | |
| To income tax | | | | 801 | 12 | 4 | | | | |
| To law expenses | | | | 34 | 0 | 2 | | | | |
| To annuity to Mr. John Evans, late superintendent | 100 | 0 | 0 | | | | | | | |
| To annuity to Mr. J. Cowell, late accountant | 65 | 0 | 0 | | | | | | | |
| | | | | 165 | 0 | 0 | | | | |
| To sick and benevolent fund | | | | 130 | 0 | 0 | | | | |
| To debts due at the stations being bad, written off, viz. :— | | | | | | | | | | |
| Westminster station-light account | 877 | 8 | 11 | | | | | | | |
| Brick-lane „ „ | 534 | 14 | 2 | | | | | | | |
| Curtain-road „ „ | 138 | 15 | 5 | | | | | | | |
| | 1,550 | 18 | 6 | | | | | | | |
| Received on bad debts | 73 | 11 | 11 | | | | | | | |
| | | | | 1,477 | 6 | 7 | | | | |
| To amount written to the credit of new works | | | | 2,765 | 0 | 0 | | | | |
| | | | | 98,550 | 5 | 10 | | | | |
| To balance | | | | 8,489 | 2 | 7 | | | | |
| | | | | £107,039 | 8 | 5 | | £107,039 | 8 | 5 |

After the accounts were read, Mr. Box made a long speech respecting them; and seemed evidently not to understand the way in which the sum taken from the contingent fund to make up the dividend was accounted for. The deputy-governor, however, in a very clear manner explained this to the satisfaction of the meeting.

Mr. WM. HAWES: I am about to complain, sir, of the accounts which it is now proposed to adopt, but upon very different grounds to those of the previous speakers. I do not intend to waste the time of the meeting in discussing whether or no you have exercised a wise discretion in taking the paltry sum of £2700 from the contingent fund; nor shall I wait to discuss whether the directors are to receive a little more or a little less than their present allowance. I will leave the meeting to decide this when they have heard the statement I have to make. My complaint is, not that you do not make profit, but that you do not divide it; not that you have wasted our capital, but that you have hoarded it; not that you have paid dividend out of capital, but that to an unfair extent to existing shareholders you have capitalised profits. Now, sir, if I can prove all this, and also prove that, without any call for new capital, you have doubled our works, have increased our produce of gas per ton of coals, have in every way lessened waste, then I hope to receive the support of this meeting to the proposition, that our dividends are too low; and that it is unjust to existing shareholders to apply the profits made from our capital to the benefit of our successors. Before I enter upon the statement I have to make, allow me to say, I was led to this inquiry from the extraordinary statements made by gentlemen to the last meeting, who have again to-day occupied too much of our time in petty matters, losing sight entirely of the real reason why we have recently only paid 4 per cent. instead of 6 per cent. on our capital. I fear we are adopting the bad practice, too common at meetings of shareholders, of depreciating our property instead of upholding it—we are proving ourselves to be unworthy of the title of a nation of shopkeepers, for I have always thought it was the first duty of a shopkeeper to extol the quality of his wares, and not to depreciate them. I will not adopt this practice, but will endeavour to prove, and I think I shall convince every shareholder present, that there is no gas company in London whose pecuniary position is better than ours, if there be one so good. 1. As to our capital:—I find it was originally £660,000; *it is now only* £580,690; having decreased in June 20, £79,310; and this has been accomplished by buying shares with our profits.—2. As to our property:—I find we possess freehold property which has cost £42,720, of which there is no entry whatever in the balance-sheet. This has also been bought out of our profits.—3. As to our works:—I find we have expended in *new* works, not in the restitution of old works, but in new and substantial works to last for years, £93,433; and this has also been paid out of the profits; and also that, in the 10 years from 1843 to 1852 we have expended for new mains £36,028, and for meters 58,000, and these items are not, as they should be, to be found in the balance-sheet. These sums, amounting together to the enormous sum of £309,491, have all been paid out of the profits, year by year, and there is not credit in our balance-sheet for these or any part of them. Where are they, then? They are here on these premises. And it is this expenditure which, without any new capital, has enabled you to extend your manufacture from the use of 50,000 tons of coals to 90,000 tons, and your production of gas from 350 millions of cubic feet to nearly 800 millions. But besides this enormous sum of £309,000, every penny of which is actively employed for your benefit, the directors have written off our plant for depreciation of value nearly £120,000 besides, and in addition to the annual outlay for wear and tear required to keep the premises in working order. Now, the ordinary complaint against directors is for adding to the capital account, not for reducing it for paying dividends out of capital, not out of profits, and for exaggerating profits; but your directors have systematically, and to a fault, acted upon a system in direct opposition to this: they have doubled our plant—converted leaseholds into freeholds—laid down miles of new mains, and provided meters without taking credit for one or the other in the balance-sheet, or with the shareholders for steadily pursuing so safe a system. Now, sir, let us turn to the manufacture, and ascertain whether this expenditure of our capital has been to hide careless and expensive manufacture—let us see whether this investment, in *new works* especially (£93,000), has produced any result. I find that in 1833, the average price of gas was 11s. 3d. per 1000 feet, and in 1853 but 4s. 3d. In 1833, for every 1000 feet delivered from the works only 562 was paid for; but in 1853 for every 1000 delivered, 843 were paid for; so that, whilst the nominal prices were 11s. 3d. and 4s. 3d., the net receipt for the gas was but 6s. 4d. in 1833, and 3s. 8d. in 1853. The public have gained nearly 5s. per 1000 cubic feet; the company by proper management has only lost 2s. 8d. per 1000 cubic feet. Again, the same favourable result appears in the produce of gas from the ton of coals; it has increased steadily from 8100 to nearly 9500 cubic feet per ton. Now, sir, with these facts before the shareholders, and every one might have obtained as I have by enquiry, I cannot understand the discussions which have taken place at the last two meetings of this company; one gentleman complaining of this petty grievance, another attacking the directors, and proposing to reduce their salaries and restricting their attendances. Why, we ought to encourage their attendances; we ought to concentrate all our works here; for it is easy to show that, by the division of the works, one or two directors looking after one station, and others after another, we have less profitable results than here at our main establishment. To limit the attendances of your directors, and to make the salary hardly worthy acceptance, would soon throw the management into the hands of irresponsible subalterns. It may be possible that the honourable gentleman who makes this proposition, has some new nostrum for the management of the works; he may wish to create a managing directorship, for we often find some pretended petty economy hides a gross and extravagant job. But I hope it is not so. Now to my complaint against the balance-sheet. Instead of writing off only £2700 from your contingent fund, it all ought to be divided amongst us—it is accumulated profit; and if I have shown a vast increase of property to represent our capital—if I have shown that the plan of appropriating so large a portion of our profits to new works is unjust to existing shareholders, I hope I shall induce the board to reconsider their system, and to adopt one more just to the present proprietary. With this view, sir, I would suggest a valuation of our property—let us know what our assets are—and we shall then be able to consider with advantage the amount to be annually appropriated to dividend. Of this I am sure, you may soon return to the old dividend of 6 or 7 per cent., very much to your own credit as directors, and to our advantage as shareholders. And now, leaving the subject in your hands, feeling sure it will receive your best attention, I will not on this occasion make any motion, but simply confine myself to a declaration of the principle upon which our

accounts, in my humble judgment, should be made up, viz.: that the existing shareholders are entitled to the profit earned by their capital, without any reserve being made for those who may succeed them.

Mr. GRAY thought the directors were not at all well paid for the time and attention they bestowed on the affairs of the company; in fact, the reverse. He was clearly of opinion, they had acted wisely in not reducing the dividend, but to make up the deficiency, which had been caused by circumstances over which no one had any control, from that fund which had itself been made from the excess of profits made in former years, and was formed to meet any contingency. A contingency had arisen in the shape of a Cannel Coal Gas Company, which threatened materially to affect the rental of the company; and this had been met in a very prompt and satisfactory manner by this company, by new works at Westminster Station, and by alterations, and the laying of new mains, at a very large outlay. The policy of this proceeding was apparent, and the result had proved the soundness of the directors' views; and he thought the shareholders were doubly indebted to them for their attention to their interests. He thought the course pursued by the directors for the last few years was the right one; to let the present shareholders have the full benefit of all the profit the concern made, and not to pay for extraordinary works out of the profits. He deprecated, with the shareholder who last spoke, the course pursued by some of their body in running down their property, and hoped a new light had now dawned on them, and that they would do all they could to still further enhance the valuable property which they possessed.

A dividend at the rate of 4 per cent. per annum was then agreed to; and

After a special vote of thanks, moved by Mr. J. BOX, to the governor for his conduct in the chair, and also for his valuable explanations; and to the directors for their constant attention and abilities shown in the management of the company's affairs, the meeting separated.

## GREAT CENTRAL GAS CONSUMERS' COMPANY.

The Seventh General ordinary Meeting of the Shareholders of this Company took place at the London Tavern, Bishopsgate-street, on Friday evening, the 27th ult.

Mr. THOMAS DAKIN, chairman of the board of directors, presided.

The SECRETARY having read the advertisement convening the meeting, the CHAIRMAN read the following report of the directors:—

"The directors have the satisfaction of again meeting the proprietors on this the fourth anniversary of their supplying gas to the city of London, and of laying before them the balance-sheet of the company's operations during the half-year ending in June last. These statements, it will be seen, do not bear the signatures of the official auditors, as, by the terms of the company's act, they are only to be called in for the purpose of auditing the accounts at Christmas in each year; nevertheless, they may be strictly relied on as exhibiting an accurate statement of the moneys paid and received both on capital and revenue accounts, and on which the directors ask the proprietors to act, in declaring the dividend from the surplus profits thereon.

"It will be seen from these statements that there is an available balance of £8006. 14s. 6d., after payment of all working expenses, interest on debentures; and the amount determined on by the shareholders, at their meeting in April, 1853, should be carried to a depreciation account for the purpose of meeting charges for the repair and replacement of meters, services, &c.

"The directors trust that the statement which has been printed and circulated amongst the proprietors meets with their approval, evincing as it does a steady increase in the business of the company, which takes its stand amongst the established and profitable undertakings of the metropolis.

"In the reports made from time to time to the Corporation of the city of London, by Dr. Letheby, the eminent chemist, it will be seen that the quality of the gas supplied by the company has been upwards of 31 per cent. higher than the standard fixed by the clause in our act of Parliament. The last report from that gentleman is as follows:—

"'Gentlemen,—I have the honour to report that the average illuminating power of the gas supplied to the city of London by the Great Central Gas Consumers' Company during the last quarter, has been equal to that of 13·8 sperm candles, or 15·8 wax, each consuming the standard amount of 120 grains per hour. These results have been obtained in the usual way, by burning the gas according to the act of Parliament directions; and they show that the illuminating power of the Great Central gas has been nearly 32 per cent. greater than is required by the act of Parliament. I have also the satisfaction to state that the chemical quality of the gas has undergone improvement since the last report.

"'HENRY LETHEBY, M.D.'

"These results prove the satisfactory operations of the company's works in the hands of their scientific engineer and contractor, Mr. Croll.

"The rental derived from private consumers during the past half-year is greater by the sum of £400 than in the corresponding half-year of 1853. This amount, though not large, is rendered more satisfactory when the diminution in the hours of business is considered, and the tendency of the early-closing movement to diminsh the consumption of gas.

"The result of the half-year's working, up to June last, enables the directors to recommend that a dividend, at the rate of 8 per cent. per annum, be declared, payable on or after the 15th day of November next, which will require a sum of £6000, leaving a balance of £2006. 14s. 6d. to carry over to the credit of the next half-year's account."

## GREAT CENTRAL GAS CONSUMERS' COMPANY.

*Dr.* BALANCE SHEET, JUNE 24, 1854. *Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To paid-up capital | | | £150,000 0 0 | By cash at bankers', viz.:— | | |
| To creditors on debentures | | | 66,000 0 0 | General account | £ 5,694 15 3 | |
| To creditors on bills payable | £ 6,766 14 2 | | | Dividend account | 275 13 0 | |
| To creditors | 11,298 15 11 | | | | | £ 5,970 8 3 |
| | | | 18,065 10 1 | By stock (pipes, branches, tubing, &c.) | | 3,388 10 8 |
| To depreciation fund | | | 1,800 0 0 | By gas rents and arrears for the quarter ending June 24, 1854 | | 16,647 19 7 |
| To dividends unclaimed to date | | | 275 13 0 | By lands, works, plant, services, and meters | 197,511 2 10 | |
| To interest on debentures | | | 1,526 0 8 | By preliminary expenses | 20,602 14 7 | |
| To revenue account, for balance to date | | | 8,006 14 6 | By office furniture and fixtures | 753 2 4 | |
| | | | | By works in progress | 800 0 0 | |
| | | | | | | 219,666 19 9 |
| | | | £245,673 18 3 | | | £245,673 18 3 |

*Dr.* REVENUE ACCOUNT, from Dec. 24, 1853, to June 24, 1854. *Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To cost of gas purchased for the half-year ending June 24, 1854 | | | £11,350 18 11 | By balance from last revenue account, Dec. 24, 1853, as per official auditors' statement | £8,902 5 7 | |
| To interest | £ 229 19 7 | | | Less dividend declared April 28, 1854 | 5,625 0 0 | |
| To interest on debentures | 1,587 9 6 | | | | | £ 3,277 5 7 |
| | | £1,817 9 1 | | By gas supplied to consumers and public lights, for the half-year ending June 24, 1854 | | 23,586 6 6 |
| To income tax on debenture interest | 48 2 6 | | | | | |
| To income tax on profits | 164 1 3 | | | | | |
| | | 212 3 9 | | | | |
| To directors | 500 0 0 | | | | | |
| To chemical referees | 127 10 0 | | | | | |
| To official auditors | 55 13 0 | | | | | |
| To corporation inspector | 50 0 0 | | | | | |
| To ditto, meter testing | 17 1 6 | | | | | |
| To solicitors' charges | 12 7 8 | | | | | |
| To salaries | 768 6 6 | | | | | |
| To trade charges | 417 7 4 | | | | | |
| To stationery and advertisements | 121 12 1 | | | | | |
| To wages | 576 6 3 | | | | | |
| To rent, rates, and taxes | 640 4 5 | | | | | |
| To bad debts and allowances | 389 17 1 | | | | | |
| | | 3,676 5 10 | | | | |
| To depreciation fund, as per resolution of general meeting of shareholders | | 1,800 0 0 | | | | |
| | | | 7,505 18 8 | | | |
| To balance carried down | | | 8,006 14 6 | | | |
| | | | £26,863 12 1 | | | £26,863 12 1 |
| | | | | By balance brought down | | £8,006 14 6 |

Mr. Rowe? I wish to know if the dividend is free of income-tax.

The Chairman: No; and the reason why is this: we prefer giving an additional rate of dividend; and when our company is more established, and the consumption of gas is much greater, then we may be able to pay dividends clear of income-tax. Whenever we have a surplus over 10 per cent., we will devote that surplus to the paying off of former deficiencies between 7½ and 10 per cent., so that the shareholders may have 10 per cent. for former as well as future years, and that the promise of paying 10 per cent., with which the company started, may be realised by the shareholders. (Cheers.)

Mr. Rowe: How long has Mr. Croll's contract to run? and have we reason to expect that he will still continue to supply the company with gas at the same illuminating power, at 16½d. per 1000 cubic feet?

The Chairman: Mr. Croll's contract is for 21 years. It is profitable to all parties at present, and we have every prospect of being able to continue it on the same terms.

Mr. Rowe: Is the price 16½d. per 1000?

The Chairman: Yes; but that was the price at which it was calculated at the gasholder. It was, however, found that, owing to the effects of temperature and barometrical pressure, we were not doing justice to Mr. Croll at that price; and therefore we made a special contract with Mr. Croll, that he was to take all the leakage, and make the price 1s. 9d. at the consumer's meter. At the end of each quarter the amout of gas consumed is taken; the consumers get it at 4s., and out of that Mr. Croll gets 1s. 9d. This is the state of the account, except that part which relates to the public lights.

Mr. Rowe: It was stated to us at a former meeting that Mr. Croll's price was to be contingent on the shareholders receiving 10 per cent. dividend. That was clearly stated in your report, which is now in print. It was stated in your printed report that Mr. Croll had increased the illuminating power of the gas, and that he would not charge anything extra for that increased illuminating power until the shareholders had received 10 per cent. dividend.

The Chairman: The original contract which Mr. Croll made with us was, to supply us with gas whose illuminating power would be equal to 9½ candles. However, in the course of the business of the company, it was found that the effect of competition rendered it necessary to supply gas at a higher illuminating power. Mr. Croll then stepped forward and said, "Gentlemen, I shall enter into an arrangement with you to supply you with gas of an increased illuminating power at the rate of a halfpenny per candle per 1000 cubic feet, over and above the illuminating power I am obliged to give you; and I will not ask for payment for that increased illuminating power until the shareholders receive 10 per cent." There is an account now kept of the value of the gas, and, whenever the shareholders receive 10 per cent., Mr. Croll is entitled to come to us and receive payment for any increase in the illuminating power. At present he trusts to you for compensation for the improved quality of the gas, until you receive a profit of 10 per cent.

Mr. Rowe: I have asked those questions because various statements have gone abroad respecting the agreement which the company has made with Mr. Croll. I think, Mr. Chairman, the explanation you have given is perfectly satisfactory to the shareholders. (Hear, hear.) It shows that both the directors and Mr. Croll have kept faith with the company. I know that Mr. Croll has kept faith with the company. I am quite aware that he has received no satisfaction for the increased illuminating power of his gas, and that the remuneration he is to receive is contingent on the shareholders receiving a dividend of 10 per cent.; but I was desirous that the shareholders generally should be aware of the exact nature of the transaction.

The Chairman: It is nothing more than a simple sum in arithmetic. If you take the amount of rental received—say £45,000 per annum—Mr. Croll would receive 1s. 9d. if we had no public lights, and the company 2s. 3d. per 1000 feet. That is the proportion; and, taking the private consumption, which this half-year amounts to £20,606.9s.1d., of that amount he receives 1s. 9d. and the company 2s. 3d. But then the rental is made up partly of public lights, amounting to £2219.17s.5d. These are not governed by the same rule; we get a certain amount per light, irrespective of the quantity of gas consumed, and Mr. Croll gets a greater proportion, inasmuch as he does it at a cheaper rate under competition. Our profits upon the public lights for the half-year are £671. 18s. 2d. Therefore, although we do not get the 2s. 3d. out of every 4s., we do realise a profit of £671. 18s. 2d. out of the £2219. 17s. 5d. received for the public lights.

Mr. Rowe: I am very much obliged to the chairman for his kind explanations, and I shall have great pleasure in seconding the motion for the adoption of the report.

The Chairman then put the resolution, which was carried unanimously.

A Proprietor: I have understood that Dr. Letheby reports that there is a larger quantity of sulphuretted hydrogen in our gas than in that of other companies which he had tested.

The Chairman: That matter was dealt with at some length at the last meeting. There was a statement made to the Commissioners of Sewers that Dr. Letheby had found in one of the companies' gas a large amount of sulphur, which he rendered formidable by saying that such an amount of sulphur would make a large quantity of sulphuric acid. It was stated that Dr. Letheby was then speaking of the gas of the Great Central; but I stated, on the authority of Dr. Letheby, that it was not the gas of the Great Central that he referred to in that statement.

The report was then adopted, and also the statement of accounts.

On the motion of the Chairman, the seal of the company was then affixed to the register.

The Chairman, in answer to a shareholder, then said that, as some other companies manufactured gas from cannel coal, they (the Great Central) felt themselves compelled to put themselves in a position to compete with them, and to show that they were able and willing, having means and capital at their disposal, to supply the public with as good an article as any other company. As the company now produced a good description of gas from Newcastle coal, he did not think the public would call for any other. It might, however, be satisfactory to the shareholders to know that if any of their customers required cannel coal gas, the company were in a position to supply them, for they had a double set of mains laid down, most perfect in their nature, from the entrance of the City to St. Paul's Churchyard; and the company were in a position to maintain that double set of mains without incurring any large additional expenditure. He did not think, however, that the company would be called upon to give two kinds of gas, but to be forewarned was to be forearmed. He was pleased to find that a much better feeling was growing up between them and the existing companies. They might now take it for granted that the Great Central Company was one of the established institutions of the metropolis. Of course, they had had a severe battle to fight with two companies which divided the City between them, and who defended their position with great courage and pertinacity; but, like the allied forces on a recent occasion, the Great Central Company won the battle, and were now masters of the field. He was happy to inform the shareholders that at present a friendly and amicable feeling existed between the gas companies. There were certain parties who were slow to make their payments, and every company must necessarily have a large amount of bad debts; but the feeling between the companies was such, that no company would take the customers of another, unless they had paid what was due to the company they were going to leave. Therefore, persons who were unable or unwilling to pay their debts could not escape from their obligations by playing off one company against another. The Great Central Company had now a rental of between £40,000 and £50,000 a year; they rendered a good supply of gas, of excellent quality, to the people of London, and in such a manner as not to imperil the interests of those who had placed their capital at the disposal of the directors. (Cheers.)

In answer to a question from Mr. Lowe,

The Chairman said the early closing movement interfered much with the consumption of gas, and took a large slice from the company's profits. The beer bill of last session, which affected the licensed victuallers and hotel keepers, also tended to diminish the consumption of gas. He did not complain of those movements, which he thought were in the right direction, but he mentioned them as circumstances tending to diminish the revenue of the company.

Mr. Lowe: How is the depreciation fund to be dealt with? Is it to be invested, or is it to be a mere floating balance?

The Chairman said that, from the very nature of gas accounts, they could never have a closed capital. The expense of meters, services, &c., could never be accurately estimated beforehand.

Mr. Rowe was quite certain that the fair manner in which the chairman had answered the questions put to him must tend to increase the character of the company in public estimation; and he (Mr. Rowe) therefore had great pleasure in proposing a vote of thanks to the chairman and his brother directors for their continued and unremitting exertions in promoting the interests of the company.

Mr. J. Lowe seconded the motion.

Mr. Wm. Pearse: I would be glad to know if this company is going to Parliament next session for any important powers?

The Chairman: Mr. Pearse, as a very large proprietor in this company—(laughter)—may rest assured that we will take no important step without consulting him and the other proprietors. (Cheers and laughter.)

The resolution was then put and carried unanimously.

The Chairman having briefly returned thanks, the proceedings terminated.

## LONDON GAS COMPANY.

The half-yearly meeting was held at the Freemasons' Tavern, on Wednesday, October 11; Mr. Hawkins, chairman of the board of governors, presiding.

The advertisement by which the meeting had been called having been read by Mr. R. Hinde, the secretary, and the seal of the company having been affixed to the register of shareholders,

The Chairman read the following report from the directors:—

"Your directors submit to you the balance-sheet and half-yearly account, showing the result of the manufacture and distribution of the company's gas up to the 30th day of June last A statement of the profit and loss for the past half-year is annexed to this report. It will be seen by the statement of the dividend fund, that a sum of £6295. 18s. 4d. remains applicable to dividend. Of that sum £3735. 1s. 6d. will be appropriated to the payment of the dividend upon the first preference shares of 1849, due on the 15th instant, leaving a balance of £2560. 16s. 10d. to the credit of the dividend fund; out of which the directors recommend that 15s. per share be paid on and after the 15th day of December next, on account of suspended dividends on the preference shares of 1840, commonly known as blue preference shares.

"Some disappointment cannot but be felt that the profits are not larger, though the directors never themselves anticipated, nor led their brother shareholders to anticipate, that those of either of the two last half-years could be satisfactory. It is true, the result for the half-year ending Christmas last was more favourable than had been expected, though the anticipated burdens had been severely felt. They have been felt still more severely in the past half-year. The cost of coal, for instance, has been about £7000, and the wages and wear and tear, each about £1000 heavier than in the corresponding half of last year; and a similar increase is observable in other items in the manufacturing department. The sum charged to coal—under which head rosin is included—is considerably augmented by the use, in January and February last, of large quantities of rosin and of inferior ceal, purchased as it could best be obtained, during the frost, at very high prices. The use of rosin is one of the many evils attendant on the alarming deficiency of gasholders, so often alluded to in these reports. The wages have of course been affected by the increased cost of labour, but far more by a cause which has also operated upon the wear and tear and other items, namely, the expense of transition

from the former mode of manufacture to that now adopted. It will readily be understood, that during this state of transition, it has been necessary to employ a larger number by far of mechanics, smiths, carpenters, pattern-makers, bricklayers, and labourers, than would have been requisite for the commercial purpose of making gas; and that the process of pulling down, displacing, and reconstructing, could not be carried on without a large consumption of goods and tools; and that the manufacturing process itself has suffered during these alterations. Such of these expenses as have been incurred during the half-year are charged against the half-year, as the only safe course; while little or no benefit has been derived from alterations, few of which were available before the end of June. These drawbacks upon the profits cease, from their very nature, with the completion of the contemplated improvements. They are, indeed, sensibly diminished at the date of this report, though they have materially affected the earliest part of the current half-year, and will to some extent affect the latter part.

"The above-mentioned heavy expenses have been, in some measure, balanced by the increased receipts for coke, breeze, and tar. This was to be expected; but the real matter of encouragement appearing on the accounts is the great increase of rental, about £3000, as compared with the corresponding half-year; and it is the more so, when it is recollected that it would have been considerably greater in some districts had the mains supplying them been of adequate size; and in all districts, had the company possessed proper gasholders.

"The evils, then, from which the company had suffered in the past year are—1. The defects of the old system of manufacture, augmented by the expenses incident to a state of change from one system to another. 2. Want of sufficient mains in certain districts. 3. Utter inadequacy of gasholders. It remains to see how far the directors have carried out the scheme proposed by themselves, and sanctioned by the shareholders, and which was intended to remedy these evils.

"To this end much—and considering the means at the disposal of your directors, very much—has already been effected. In lieu of iron retorts worked without an exhauster, we have been, and shall be during the current half-year, making our gas almost exclusively in long clay retorts, aided by an efficient exhauster, by which means the quantity of fuel consumed will be diminished, and the quantity of gas produced increased. Two station meters of the best description, through which the whole of the gas is passed, have been erected, and are in use; so that any error as to the quantity of gas made, in either of the great divisions of the works, will henceforth be impossible; and the constructing of proper photometers has given the directors the same control over the quality. One of the gasholders, mentioned in the two last reports as intended to be enlarged, has been nearly completed, under the superintendence of our own engineer; and he reports that it will be at work in a few days. Storage-room for gas, greater by one-third than that which the company possessed last winter, will thus be obtained. But this addition, important as it is, is still utterly inadequate; and until proper storage-room be provided, our shareholders must be content to see a large and increasing portion of what might be dividend wasted every winter in miserable expedients to supply the deficiency, to say nothing of the constant danger to the company, and the consequent increasing watchfulness and anxiety with which its engineer and other officers are harassed. In order to avoid one of the many dangers and expenses which were incurred last winter, your directors have thought it right to store above 7000 tons of coal more than in the previous years. This has of course been a further drain upon the floating capital of the company. The increase and extension of the leading principal mains, the great arteries by which the districts are fed, are now complete, or nearly so, and have been made upon a scale which it is hoped will meet the demand for some considerable time, and render any great further outlay unnecessary.

"Two, therefore—namely, defective manufacture and want of sufficient mains—out of the three great drawbacks under which the company has laboured, may be considered as remedied. The third and greatest—namely, the want of gasholders—slill remains without a remedy; for the additional storage-room to be obtained from the enlarged gasholder mentioned above as nearly complete, important as it is to us, is still so utterly out of proportion to our wants that it does not deserve to be considered as a remedy.

"Looking, therefore, at the absolute necessity for taking active steps towards providing sufficient gasholders, and meeting other contingencies, your directors have contracted for the purchase of a piece of land of considerable dimensions, and admirably adapted to the purpose to which they propose applying it.

"It will be recollected that, by an arrangement between the other three companies in Surrey and ourselves, separate districts were assigned to each. It was then agreed that each of the companies should, during the next session, endeavour, by application to Parliament, to obtain an act, limiting its operations to the district which had been assigned to it. The company being thus obliged to apply to Parliament for an act in the ensuing session, your directors, though they would have preferred waiting, until, by a year's experience, they could judge of the probable results of the recent improvements, propose to take the opportunity of introducing into the bill such powers for capitalising the arrears of dividend on the blue and red shares, with the customary consent of the proprietors, and also of inserting such other clauses as the present and probable future condition of the company appear to render advisable.

"It will readily be believed that much anxious consideration has already been bestowed upon so important a subject, though the scheme is not yet ripe to be laid before the shareholders; but no delay shall occur in submitting it, with the proposed bill, to their consideration, as soon as matured, with the able assistance of the company's solicitor.

"The notices required by the standing orders will be given at the proper period."

*Dr.* PROFIT AND LOSS ACCOUNT, for the half-year ending June 30, 1854. *Cr.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Coal | £27,584 | 1 | 1 | Gas | £43,206 | 16 | 8 |
| Lime, &c. | 466 | 6 | 3 | Coke and other products | 16,496 | 6 | 6 |
| Stores | 1,572 | 12 | 8 | Rents | 454 | 15 | 3 |
| Wages | 8,599 | 1 | 4 | | | | |
| Wear and tear | 3,333 | 15 | 0 | | | | |
| Royalty | 654 | 18 | 9 | | | | |
| Meters—repairing and fixing | 1,263 | 3 | 8 | | | | |
| Directory and auditing | 530 | 0 | 0 | | | | |
| Salaries | 1,448 | 7 | 0 | | | | |
| Rates and taxes | 475 | 11 | 10 | | | | |
| Rents | 693 | 16 | 0 | | | | |
| Commission | 852 | 16 | 9 | | | | |
| Stationery and incidental expenses | 639 | 18 | 9 | | | | |
| Allowances and bad debts | 1,307 | 19 | 1 | | | | |
| Law expenses | 300 | 0 | 0 | | | | |
| Gas supplied by other companies | 151 | 6 | 2 | | | | |
| Depreciation | 3,018 | 1 | 8 | | | | |
| Income tax | 42 | 16 | 8 | | | | |
| Balance | 7,223 | 5 | 9 | | | | |
| | £60,157 | 18 | 5 | | £60,157 | 18 | 5 |
| Interest on borrowed money | 2,430 | 15 | 11 | | | | |
| Balance | 4,792 | 9 | 10 | | | | |
| Total | £7,223 | 5 | 9 | Balance brought down | £7,223 | 5 | 9 |

*Dr.* DIVIDEND ACCOUNT. *Cr.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Amount at first preference shares dividend, March 31, 1854 | £3,726 | 2 | 9 | Surplus profit, December 31, 1853 | £6,668 | 16 | 3 |
| Ditto blue shares dividend | 1,439 | 5 | 0 | Balance as above | 4,792 | 9 | 10 |
| Balance | 6,295 | 18 | 4 | | | | |
| Total | £11,461 | 6 | 1 | Total | £11,461 | 6 | 1 |

RICHARD DEELEY,
MILES MILEY, Jun.
GEORGE HALLETT, } Auditors.

The CHAIRMAN then moved the adoption of the report, and stated his readiness to give any information respecting their affairs which shareholders might require.

Mr. SPRAGUE (Deputy-chairman) seconded the motion, which, after a short discussion, was unanimously adopted, and a vote of thanks to the chairman and directors, for the able manner in which they had conducted the affairs of the company, concluded the proceedings.

## GENERAL MEETING OF THE SHEFFIELD UNITED GAS COMPANY.

The Half-Yearly Meeting of this Company was held at their Offices, Shude-hill, on the 12th ult.—Mr. WM. LOCKWOOD, Chairman of the Board of Directors, presiding.

The directors' report was read by Mr. WAKE.

The CHAIRMAN moved, and T. GOULD, Esq., seconded, the adoption of the report.

Mr. DAVID JOHNSON said, the report mentioned that the revenue of the half-year was £1931, which, with the reserve fund of £2696, made a total of £4628; and that the directors recommended that this sum, less £38. 11s. 3d., should be appropriated to the payment of the present half-year's dividend. He asked if the £38. 11s. 3d. was all that would remain of the reserve fund?

The CHAIRMAN: Yes, that will be all that is left of it.

Mr. JOHNSON said, with regard to the differences between the two companies, as to the terms of the deeds of amalgamation, he was glad that they had gone to the arbitrator, for it would show the new company and the public that this company were not in the wrong, as the arbitrator granted them all they had asked for. As to Mr. Unwin's salary, he wished to know what amount he had been receiving, as compared with the £650 which they now proposed to give him?

The CHAIRMAN said Mr. Unwin's salary was first fixed at the amount of the dividend on 120 shares. In 1847, when the sale of gas

had trebled, it was increased to the dividend upon 150 shares, at which amount it has since remained, though the consumption of gas last year was six times that of the year when Mr. Unwin's salary was first fixed.

Mr. JOHNSON: What is the difference between his salary last year and what you now purpose?

The CHAIRMAN: Up to 1847 it was £228 a year; then it was raised to £270, and last year it was £300.

Mr. JOHNSON asked if the increase to £650 was intended to be permanent?

The CHAIRMAN said, of course it would be subject to revision at any time, but it was fair he should state that the directors did not contemplate that it would be altered.

Mr. M'TURK said, he certainly could not allow this resolution to pass unnoticed. Their directors had placed them in a most unenviable position. Hopes had been held out to them, that if they would only grant the directors power, the new company could never disturb them. The shareholders placed confidence in the directors, and gave them all the powers they asked. Alderman Carr said gas ought to be as free as the air we breathe. A year ago, he (Mr. M'Turk) remarked, that he could not conceive how that was possible; but now he thought they had almost reached that point, for the last half-year had brought them only one per cent. profit. Feeling much dissatisfied with the proceedings of the directors, and knowing for a fact that resolutions were passed at their board which were never entered on the minutes, he had asked to see the book, but was told he could not without going to Mr. Wake's office. He was not inclined to do this, and wrote to Mr. Unwin, who replied that he could not let him have the minute book without an order from the directors. Yet the act of Parliament expressly required that books should at all reasonable times be open to the inspection of the shareholders. He was so dissatisfied with the state of things, that, when the new company's bill was before Parliament, he went to London to watch the proceedings, for he feared very much that they were being led by a will-o'-wisp into a quagmire. Directly the committee room was cleared, he was told that their company had agreed to buy up the new at £4 a share, and theirs should remain as £25 paid up. But, by-the-by, the shareholders of this company would have to pay the other £1; that would be a nice bite for them. But he should suffer as much as any one, for he was the second largest shareholder, though he had been represented as only the fifth. He remonstrated against this in the lobby of the House of Commons, but was told to be quiet; it would never be carried into effect. This induced him to suggest a postponement of their agreement to amalgamate until he new company had held their meeting, for he was assured by several of the directors that nothing of the kind should ever take place. They were told at the last meeting, that the fewer shares that were taken of the new company, the better it would be for them. But he found from the *Independent* that they were to pay the new company £39,264 for their plant, and £7000 for their liabilities. What were they to get in exchange for this? The new company's accounts were to be audited and delivered to this company on the 31st of July. Had they been yet received? [Mr. UNWIN: No.] He told Mr. Unwin in the lobby of the House of Commons that fictitious bills had been given for quantities of the new company's shares at £2; that these bills were not to be paid out of the bank, and it was a question to him whether more than two of them were ever paid. The shares were issued, therefore, upon spurious capital, and it was a gross injustice that this company should take to them at £4. Mr. Unwin's reply was, that these things could not be helped; that there was no alternative but to submit to them. The propositions of Mr. Jackson included their charging no meter rent. They might pull him over the coals as they liked for stating what passed, but he should say nothing but the truth. When Mr. Jackson met them afterwards, on his way into the House, he asked, "Well, gentlemen, have you considered my suggestions?" Mr. Unwin replied, "Yes, but I cannot see my way clear to adopting them." Mr. Jackson said, "Is one man to be a dictator to the whole company?" and walked away. The shareholders might be thankful that they had some person to stick up for them; for the consequence was that Mr. Jackson conceded the point, that they were to be allowed to charge rent for meters as at present. Yet, after such conduct, their directors could say, in their report to the last meeting, that the charging no rent for meters was a matter to which they could not submit. Preposterous! He could not sanction the report until the directors showed him one thing in which they stood not out against Mr. Jackson's suggestions. In their last report they pretended that the demands were unprecedented; that they stood out against them, &c.; when, in fact, they swallowed the whole concern. The directors had frittered away the shareholders' chance of a dividend; and now Mr. Unwin must be paid a fixed salary, instead of after a sum varying, as formerly, with the dividend paid to the shareholders.

The CHAIRMAN asked whether Mr. M'Turk intended to move an amendment?

Mr. M'TURK replied that he did not.

The CHAIRMAN then put the resolution, and the report was approved, with only two dissentients.

The next resolutions, for the payment of a dividend after the rate of 17s. upon each £24 share, and authorising the borrowing, on mortgage or bond, £4500, to replace that amount of borrowed money paid off during the last half-year, were agreed to without discussion.

The CHAIRMAN said, the next resolution was one which he had very great pleasure in proposing, not, he must say, unmixed with the conscious feeling that it had been too long delayed. He alluded to the proposed advance of Mr. Unwin's salary. He had observed, throughout the many years that he had known Mr. Unwin, that he had devoted his time most sedulously to the affairs of this company, not only during the day, but frequently at night, when he ought to have been in bed. None of them could be fully aware of the time Mr. Unwin had devoted to their interests, or the knowledge and talent he had brought to bear. The board of directors were all of opinion that he had been for a long time much under-paid for his services; and, no doubt, but for the delicate position of the affairs of this company, and the contest in which they had been engaged, the subject would have been dealt with long ago. He therefore had pleasure in proposing that, from the 1st of January last, Mr. Unwin should be paid a salary of £650 a year.

ROBERT SORBY, Esq., seconded the motion.

Mr. M'TURK was sure no man in the room had appreciated Mr. Unwin's services more than he had; but he could not go with this.

Mr. SORBY said the question before them was, whether Mr. Unwin should have a salary of £650, and this reference to laying of pipes, and other matters which Mr. M'Turk had been telling about, were perfectly irrelevant.

Mr. M'TURK: They can't take Sebastopol without artillery. You must bring your battery to a certain point before you fire your guns.

Mr. SORBY: But, unfortunately, your guns are merely charged with powder. You fire blank cartridge; you are all smoke. There is no ball in your guns. (Laughter.)

Mr. M'TURK continued: The directors having swept away all their dividend, and Mr. Unwin being dependent upon that for his salary, it was very natural they should now propose to give him a fixed salary, independent of the dividend the shareholders might receive. When the proceedings were going on before Parliament, he wrote to Mr. Unwin that he had full confidence in him, but wished him to keep his weather eye open, because he was satisfied the directors were not doing right. The next account he heard was that the chairman and Mr. Wake came away from a conference of the directors, with resolutions which Mr. Unwin could not abide by. If Mr. Unwin had called the shareholders together, he should have been satisfied; but when, without doing so, he allowed the dividends of the shareholders to be swept away by the directors, that was not the right time to talk of raising his salary. The directors might not think so; but they had, in fact, taken the money out of his (Mr. M'Turk's) pocket, and given it away; and Mr. Unwin had been a party to it. Was it not Mr. Unwin's own proposition, when he was made managing director, that he should be paid a salary in proportion to the dividend paid to the shareholders? [Mr. UNWIN: Yes.] Then how came they to propose to give him a fixed salary of £650, when the dividend of the shareholders had been swept away? What would 4s. a 1000 feet do for them? With a consumption of 150,000,000 feet of gas, it would make a difference of £7000. They had been paying a dividend of £1200. If they swept away £7000 a year, and doubled their capital, where was their future dividend to come from? He concluded by proposing, as an amendment, that the question as to paying Mr. Unwin £650 a year should be adjourned to that day twelve months.

Mr. ACTON, druggist, seconded the amendment.

Mr. UNWIN wished to say a few words relative to Mr. M'Turk's imputation, that he had been overpowered by the directors. Mr. M'Turk had told them that Mr. Lockwood and Mr. Wake came from a conference with resolutions in which he (Mr. Unwin) could not concur, and many other things of that sort, wishing the shareholders to suppose that he and the directors, as a body, had been altogether at variance. He had been managing director now thirteen years, and he could say with confidence that for the whole of that period he and the other directors had acted together with the greatest unanimity. The whole board had been changed during his management, but there had never been the slightest misunderstanding between him and the other directors. They had differed in opinion at times as to the best course to be pursued, but they had acted together, and he had never had to find fault with what they had done. When Mr. M'Turk complained to him of their not stopping the new company laying their pipes, by breaking and throwing the pipes out, he had replied, "Mr. M'Turk, I am with you heart and soul. Were I acting for myself, I would do as you desire, but our directors do not think it policy to do so Many of our large shareholders tell us not to do it, or we shall have the town in a state of riot, and therefore we cannot go in opposition to them. I believe our directors are doing what they consider best for the interests of the company, and I cannot go and say I will do this, that, or the other, in opposition to the opinion of the whole board." Not that our directors did not think we had a right to do as Mr. M'Turk wished, but they thought, as a matter of policy, it was not prudent to do so. They considered that, if they carried out things in the way Mr. M'Turk talked of, they most assuredly would have had a riot. That was the substance of what he told Mr. M'Turk. With respect to the question of salary, he would say to them, as he said to the directors, Do not consider me for a moment. Whatever you think it right to pay me, state it. If I think it sufficient to induce me to remain, I will do so. Nothing would have induced me to have left you during the contest with the new company. No; I told you from the first I was satisfied we could beat them, and I intended to beat them if I had no salary whatever. But, that contest being brought to an end, I told the directors in the height of summer that the time had come for them to look out for my successor. If I had postponed it to the annual meeting, in October, they might have said I had taken them by surprise, and at a time when they could not conveniently help themselves. I shall not quarrel with Mr. M'Turk for opposing this motion. He does right to oppose it, if he thinks it wrong. As to the accounts not being published, they were always open to the inspection of the shareholders; and nobody knew better than Mr. M'Turk that he was at all times ready to go through the books with them. Last Friday, Mr. M'Turk asked to see the accounts, and he laid them all before him. Mr. M'Turk then said, "I want to see the vouchers." He (Mr. Unwin) laid them before him, and offered to go through them with him. Could any man do more than that? (Hear, hear.) As to the minute-book, it was kept at Mr. Wake's office, and he told Mr. M'Turk that if he would call there he could see it. They wished to keep no secrets from the shareholders; but, as a matter of policy, they did not think it prudent that the minute-book should be throw-

ing about at the company's office. (Cheers.) He denied the correctness of the figures Mr. M'Turk had quoted.

The Chairman put the amendment to the vote, when it was lost, only five hands being held up for it. The original motion was then carried.

The Chairman said the next business was the election of directors. The whole of those retiring offered themselves for re-election.

The resolution was carried.

The Chairman: On the part of my brother directors, I return thanks for the confidence you have again placed in us, and I hope you will never be disappointed in our doing our best, at all events, to consult the best interests of this company.

A vote of thanks to the chairman concluded the proceedings.

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Portsea.—Tenders were sent in for leasing of these works from Mr. McLeslie of Conduit-street, London; Mr. Romans of Devonport; Mr. Wale, of Ross; and Mr. A. Penny, of London; and the tender of the latter being accepted, he entered upon his contract on the 1st instant.

Calcutta.—A contract has been entered into with Messrs. J. and W. Horlon, of Smethwick, for two gasholders of 100 feet diameter, and 30 feet deep, for the gas works of this city. M. Danré the engineer left by the last overland mail to commence operations, and has been since followed by Mr. Patrick Cowan, the assistant engineer.

Winchester.—Proposals have been issued for the formation of a "Mutual Gas Company," to sell gas at 4s. per 1000 feet, in competition with Mr. Croll, the lessee of the old works of that ancient city. This is paying back with interest the originator of the low priced gas movement in his own coin.

The Liverpool New Gas Company.—The Liverpool paper of the 13th ult., contains an advertisement from seven of the provisional directors of the new company, giving notice that they have withdrawn from the concern.

The Late Mr. S. Church.—Some friends of this worthy man, whose untimely death from cholera we lately noticed, have it in contemplation to set on foot a subscription for his widow, who has been left without any provision for her support. Mr. D. Hulett, of 55, High Holborn, will be happy to receive communications from all who are disposed to give their support to so praiseworthy a movement.

Cannel Coal in Van Diemen's Land.—The chartist convict, Zephaniah Williams, is said to have discovered on land belonging to him, a combustible material of great value, and very similar to Boghead cannel. Williams is said to be likely to realise a large fortune by means of his new discovery. He was searching for coal below ground, when accidentally a lamp left ahove ground set fire to a piece of the yellow stone which lies along the surface like shale; and it was with much difficulty the vivid combustion was suppressed.

## Price Current.

CASTINGS, per Ton.

Average Weight of Cast Iron Gas Pipes, per Yard.

| 1¼ in. | 2 in. | 2½ in. | 3 in. | 4 in. | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 21 | 28 | 33 | 51 | 70 | 89 | 107 | 126 | 149 | 177 | 208 lbs. |

| Retail Prices are 5 to 10 per cent. higher. | London. | Glasgow | Newcastle. | Wales. | Yorksh., Derbysh. and Staffrdsh |
|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Pig Iron, No. 1. | 5 0 0 | 4 5 0 | 4 5 0 | 4 10 0 | 4 15 0 |
| 1¼ and 2 inches Socket Pipes | 8 17 6 | 8 0 0 | 8 0 0 | 8 5 0 | 8 5 0 |
| 2½ and 3 do. do. | 8 12 6 | 7 15 0 | 7 15 0 | 8 0 0 | 8 0 0 |
| 4 and 5 do. do. | 8 7 6 | 7 10 0 | 7 10 0 | 7 15 0 | 7 15 0 |
| 6 inches and upwards do. | 8 2 6 | 7 5 0 | 7 5 0 | 7 7 0 | 7 10 0 |
| Extra for bends, branches, and connection | 2 10 0 | 2 10 0 | 2 10 0 | 2 10 0 | 2 10 0 |
| Retorts, 2nd fusion, hot blast | 8 3 0 | 7 2 6 | 7 2 6 | 7 7 6 | 7 7 6 |
| Do. 2nd fusion, cold blast | 8 10 0 | .. | 7 12 6 | 7 17 6 | 7 17 6 |
| Tank Plates, ⅜ thick and above | 8 5 0 | 7 7 6 | 7 7 6 | 7 12 6 | 7 12 6 |
| Do. less than ⅜ | 8 15 0 | 7 15 0 | 7 15 0 | 8 0 0 | 8 0 0 |
| Plain Castings ex. models | 8 10 0 | 7 12 6 | 7 12 6 | 7 17 6 | 7 17 6 |

COALS.

| NEWCASTLE. Unscreened. | s. | d. | |
|---|---|---|---|
| Whitwell Primrose | 7 | 6 | per ton. |
| Dean's Primrose | 8 | 0 | ,, |
| Pelton | | | ,, |
| Brancepeth | | | ,, |
| Medomsley | | | ,, |
| Pelaw | 8 | 3 | ,, |
| Burnhope | | | |
| Eighton Moor | | | |
| Felling Main | | | |
| New Pelton | | | |
| Peareth | 8 | 6 | ,, |
| South Pelaw | | | |
| Waldridge | | | |
| Washington Hutton | | | |
| South Peareth | | | |
| Ramsay's Cannel | 16 | 0 | ,, |
| Cowen's Cannel | 16 | 0 | ,, |

| DERBYSHIRE. | | | |
|---|---|---|---|
| Clay Cross, Deep Main, and New Birchwood | 8s. | 6d. | per ton. |
| SCOTCH CANNEL. | | | |
| Boghead at Leith | 27 | 0 | ,, |
| Kirkness best | 23 | 0 | ,, |
| Capeldrae, first quality | 20 | 0 | ,, |
| Ditto, second quality | 12 | 6 | ,, |
| Lothian | 20 | 0 | ,, |
| Lesmahago at Glasgow | 23 | 0 | ,, |
| Ditto at Grangemouth | 25 | 0 | ,, |
| Arniston | 22 | 0 | ,, |
| Wemyss (at the pits) | 16 | 0 | ,, |
| Bridgeness | 17 | 0 | ,, |
| Kinneil | | | |
| Knightswood | 18 | 0 | ,, |
| Lochgelly | 12 | 6 | ,, |
| Lumphinan | | | |
| Methill | 11 | 0 | ,, |

FIRE GOODS.

Best Bricks, 60s. per 1000, at Newcastle.
Do. Clay, 14s. per ton do.

LEAD.

Soft pig, £24 to £25 per ton.

WROUGHT IRON TUBING, subject to 25 per cent. Discount.

| | 2 inches. | 1½ inch. | 1¼ inch. | 1 inch. | ¾ inch. | ½ inch. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Patent welded tubes, from 2 to 12 feet, per foot | 1 8 | 1 0 | 0 10 | 0 7 | 0 5 | 0 4½ |
| Ditto ,, 6 in. to 18 in., each | 3 0 | 2 0 | 1 9 | 1 3 | 1 0 | 0 9 |
| Connecting pieces, or long screws | 3 6 | 2 3 | 2 0 | 1 6 | 1 2 | 0 11 |
| Bends, springs, and elbows, wrought iron | 3 9 | 2 3 | 1 9 | 1 0 | 0 10 | 0 8 |
| Tees, wrought or cast | 4 0 | 2 6 | 2 0 | 1 6 | 1 1 | 0 10 |
| Crosses, wrought or cast | 4 6 | 3 0 | 2 6 | 2 0 | 1 6 | 1 2 |
| Iron cocks | 17 6 | 9 6 | 7 6 | 4 6 | 3 3 | 2 6 |
| Ditto, with brass plug | 28 0 | 16 0 | 13 0 | 7 0 | 5 6 | 4 6 |
| Diminishing sockets, caps, plugs, and nipples | 1 3 | 0 9 | 0 8 | 0 6 | 0 5 | 0 4 |
| Plain sockets | 1 0 | 0 8 | 0 7 | 0 5 | 0 4 | 0 3 |
| Flanches | 1 9 | 1 6 | 1 3 | 1 0 | 0 9 | |
| Syphons, 2 quart | 15 0 | 14 0 | 13 6 | 13 0 | 12 0 | |
| Ditto 1 quart | 11 6 | 10 6 | 10 3 | 10 0 | 9 6 | |

FREIGHTS, per Ton.

| *Coastwise—Newcastle.* | 8s. 6d | *Foreign.* | 10s. 0d |
|---|---|---|---|
| Chatham & Roches. | | Boulogne | |
| Cork | 12 3 | Barcelona | 27 0 |
| Dover | 9 0 | Bordeaux | 17 0 |
| Dublin | 12 9 | Cadiz | 14 3 |
| Exeter Quay | 12 0 | Calais | 10 0 |
| Folkestone | 9 3 | Constantinople | 34 6 |
| Hastings | 13 6 | Dieppe | 11 6 |
| Jersey | 12 0 | Genoa | 30 0 |
| London | 8 3 | Hamburg | 13 0 |
| Lowestoft & Yarmth | 6 6 | Havanna | 16 0 |
| Lynn | 8 6 | Havre | 11 6 |
| Margate | 9 3 | Leghorn | 30 0 |
| Portsmouth | 11 6 | Lisbon | 14 3 |
| Plymouth | 12 0 | Rotterdam | 13 0 |
| Whitstable | 9 0 | Stettin | 10 0 |
| Weymouth | 10 6 | Trieste and Venice | 36 0 |

## Advertisements.


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late of the Phœnix Iron Works, Glasgow,
IRON MERCHANT,
Contractor, Inspector of Railway Bars and Castings,
Agent for Patents, General Commission Agent.

Wanted—Agencies for the sale, on commission, of English Boiler and Ship Plates, Angle and Rivet Iron, Tinned Plates, &c.

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These Shades, manufactured exclusively by RICE, HARRIS, and SON, on an entirely new principle, effectually destroy the effluvia and smoke, and diminish the heat, which have hitherto made the use of gas so objectionable in dwelling-houses and offices, where cleanliness, freedom from smell, and a cool atmosphere, are of importance. They are simple and inexpensive, and may be had at the Works, in a variety of forms adapted to the style of fittings or the taste of the purchaser.

Islington Glass and Alkali Works,
BIRMINGHAM;
and 1, Three King-court, Lombard-street,
LONDON.

May 27, 1854.

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Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

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Parties contracting for the patent right, and paying in advance previous to being set to work, will be allowed a reasonable discount. Parties will be held responsible for the payment of the patent right, and are cautioned not to use or infringe upon the patent right without an immediate agreement with the Patentee, otherwise he will be compelled to resort to measures which will enable him to maintain his right, and which he would regret being obliged to adopt; at the same time, it is necessary to state that this patent extends over the United Kingdom of Great Britain and Ireland, including the Channel Islands. For further particulars, apply to the Patentee, Gowan-bank, Falkirk, or to Mr. James Muirhead, Engineer Ringsend Foundry, Dublin.

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